

**INFLUENCE OF THE ICT ADVANCEMENT ON RURAL
FARMERS: AN EXPLORATORY STUDY ON BARISHAL
DIVISION OF BANGLADESH**

BY

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DHAKA -1207

JUNE, 2020

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A thesis

Submitted to Department of Agricultural Statistics,
Sher-e-Bangla Agricultural University, Dhaka-1207
In partial fulfillment of the requirements for the degree of

**MASTER OF SCIENCE
IN
AGRICULTURAL STATISTICS
SEMESTER: JANUARY-JUNE, 2020**

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CERTIFICATE

*This is to certify that the thesis entitled “**Influence of The ICT Advancement on Rural Farmers: An Exploratory Study on Barishal Division of Bangladesh**” submitted to the Faculty of Agribusiness Management, Sher-e-Bangla Agricultural University, Dhaka-1207, in partial fulfillment of the requirements for the degree of **Master of Science in Agricultural Statistics**, embodies the result of a piece of bona fide research work carried out by **Md. Al-Emran Howlader**, Registration No. **13-05651** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.*

I further certify that any help or source of information, received during the course of this investigation has been duly acknowledged.

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Dedicated to
My
Beloved Parents who aid the
foundation of my success

ACKNOWLEDGEMENT

*With a great pleasure, I express my deepest sense of respect, and heartiest gratitude to my honorable teacher and supervisor, Professor **Md. Abdul Latif**, Department of Agricultural Statistics, Sher-e-Bangla Agricultural University, Dhaka for his efficient and scholastic guidance, constructive criticism, valuable suggestions and immense help to carry out the research work toward successful completion and preparation of the thesis by necessary correction through reviewing the text.*

*I am pleased to avail myself of the opportunity to express my profound appreciation and thanks to my honorable Co-supervisor, **Professor Nur Mohammad Rahmatullah**, Department of Agricultural Statistics, Sher-e-Bangla Agricultural University, Dhaka for his generous guidance. I further very thankful to **Professor Md. Zulfikar Ahmed Reza**, Chairman, Department of Agricultural Statistics, Sher-e-Bangla Agricultural University, Dhaka for his generous guidance, broad view of discussion and stimulating assistance during the period of research work.*

I express my heartfelt thanks to all the teachers of the Department of Agricultural Statistics, SAU, for their valuable teaching, suggestions and encouragement during the period of the study.

I also express my heartfelt thanks to UAO, especially SAAO of the study area.

I would like to extend cordial thanks to my friends specially Nuzhat Ahmad, Rabiul Islam, Nishat Tasnim and Md. Sazid Ahsan for their kind co-operation, valuable advice during my study. Diction is not enough to express my profound gratitude and deepest appreciation to my father and mother who sacrificed their happiness during the entire period of study and brothers, sister for their never-ending prayer, encouragement, sacrifice and dedicated efforts to educate me to this level.

Last but not the least, farmers of the study area of Barishal division, deserves special appreciation for their patience and co-operation during the collection of data.

The Author

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ABBREVIATIONS AND ACRONYMS

%.: Percentage

BBS: Bangladesh Bureau of Statistics

SAU: Sher-e-Bangla Agricultural University

DAE: Department of Agricultural Extension

GO: Government Organization

NGO: Non-Government Organization

ICT: Information and Communication Technology

TV: Television

et al: Associates

i. e.: That is

etc.: Etcetera

SD: Standard Deviation

sq: Square

NS: Not-significant

*: Significant at 0.05 level of probability

** : Significant at 0.01 level of probability

df: Degrees of Freedom

SPSS: Statistical Package for Social Science

Fig.: Figure

Tk.: Taka

r: Co-efficient of Correlation

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ABSTRACT

Agricultural development cannot be understood without the use of modern technologies like Information and Communication Technologies (ICTs). The recent developments in ICTs offer a unique opportunity to bring the production enhancing tools and technologies to the growers with much cost-effective manner. Worldwide, many studies were published on the role of application of ICTs in agricultural production. However, only a few studies were carried out to know the impact of ICT based service delivery system on agricultural production aspects in Bangladesh. Therefore, an attempt has been made to find the factors of ICTs on agricultural production, especially in the food crops, vegetables, fisheries and cattles. Using a randomized survey with a questionnaire, interviews and focus group discussion, a study was carried out with a sample of 100 farmers from a population comprises farmers all over the country. The findings from the study after counterfactual analysis and difference in differences analysis as well showed that with the application, advancement and use of ICTs, agricultural production was accelerated which was evident from the degree of increase of ICT. It had proved that the agricultural production from the ICT based service area has increased more than that of non-ICT based area. It also had clarified that ICT advancement were the key role in enhancement of annual income of rural farmers.

INTRODUCTION

1.1 General Background

Bangladesh is predominantly an agricultural country with an area of 1,47,570 square kilometers. The economy of the country mostly depending on agriculture represents directly and indirectly, almost 23 percent of the country's gross domestic product (GDP) and gives employment to 62 percent (BBS, 2004). In fact, agriculture plays a vital role in capital formation at home and for foreign exchange also. It also supplies most of the raw materials for the industrial development of the country. The country is supplying to meet the basic need of her population from its cultivatable land which is estimated around 8.29 million hectares. But still agricultural productivity of Bangladesh is one of the lowest in the world.

Through predominately an agrarian country. Bangladesh cannot produce enough food to her population. Although "Agriculture is the principal engine of growth in many low-income developing countries, where it accounts for 60 to 80 percent of all employment" (CGIAR, 1995). Food security should also be linked to environmental, social, cultural, political and institutional aspects of society (Fomo, 1999). At present food situation is alarming and the food reserve is very poor. Besides this, there is no scope to increase the cultivable land rather it is decreasing rapidly to provide new generation. On the other hand, the soils of Bangladesh are very fertile and climate is favorable for crop growth throughout the year. Thus, there is tremendous scope for increasing agricultural production in Bangladesh.

However, agricultural production can only be increased if appropriate technologies are used by the farmers, who are the primary unit of adoption to improved practices. Therefore, proper utilization of modern agricultural inputs, knowledge of the usefulness of inputs and the know-how of their use should reach to the farmers within a shortest possible time and that should be done very effectively. Further, diffusion of knowledge on modern agriculture among the rural people demands effective communication system. "More than natural resources, more than cheap labor, more than financial capital, knowledge is said to be the key factor of production" (World Bank, 1992). So, communication is essential for improving the productivity. That is the way farmers, more specially the commercial farmers can help them change their way of cultivation from traditional to modern one. Farther more different communication behavior more

effective for different person. Rogers (1962) after reviewing many studies on sources of information by stages, made a generalization that communication sources were most important at the stages in the adoption process.

Development of agricultural sector is of prime importance for our country. Therefore, to accelerate the pace of economic growth and development application of ICT could be a better proposition. Globally, the development of ICT has proven its potentials not for enhancing development efforts, but also virtually reduced the distance and turned the world into a global village (O'Farrell, 2003). Besides that, the number of devices or equipments of communication is increasing in a very rapid speed. Now a larger proportion of farmers have their own TV set and cable TV is available almost everywhere in Bangladesh. Extension communicators are more intensive than previous years. The newspaper and poster are available almost every village. But computer is not available due to its high cost. So, farmers can easily receive information through various information communication media.

The government has declared ICT as thrust sector and put much emphasis on the computerized and establishing e-governance in all aspect of development. Several ICT initiatives or programs were undertaken and the outputs of these are used for agricultural research, development and extension

Research conducted in foreign countries, particularly of the west, revealed that farmers are contacted, trained and organized generally through the sources like friend, relative contact, result demonstration, general meeting, office call, agricultural magazine, radio, television and but the very few researchers conducted research on ICT in Bangladesh and perhaps no one conducted research to find out the impact of ICT in Bangladesh.

1.2 Statement of the problem

In view of the foregoing discussion, the framework of the study stems from "Communication System" which is very important and a matter of very much consciousness to the policy makers. Agricultural information has been considered as an important input for increased farm productivity. Farmers use various sources for obtaining farm information. Moreover, by using Information and communication technologies, any message can be diffused effectively within a very short time. ICTs involve Television, Radio, Telephone, Internet, Multimedia, Magazine, Newspaper,

Leaflet, Booklet, Publication, Posters etc. But this research took Television agricultural programs, Radio agricultural programs, Telecommunication, Internet, Multimedia, Magazine, Newspaper for conducting his study and try to discover the behavioral changes with their perceived impact of use these technologies. For identifying the impact of use of ICTs as perceived by the farmers in receiving agricultural information, it is necessary to know the answers of the following questions an appropriate direction.

1. What are the characteristics of farmers towards the use of ICT?
2. What are the impacts of ICTs tools and advancement in association, differential use, networking and cultivation through ICT as perceived by the farmers in receiving information?
3. what are the statistics about selling crops, direct access to technical assistance and status of community membership through ICT?
4. What are the problems and obstacles of using ICT?
5. What are the influences between the dependent and independent variables have been discussed in a way to calculate the effects of ICT on rural farmers?

The various characteristics and situational factors of the farmers might have some kind of relationships with impact of use of Information and Communication Technologies which also taken in to consideration during the study. On the basis of the above discussion, the researcher undertook a piece of study, entitled “Influence of The ICT Advancement on Rural Farmers: An Exploratory Study On Barishal Division Of Bangladesh”

1.3 Objectives of the study

- i. To determine and describe some socio-economic characteristics of the Farmers.
- ii. To statistically describe the way of selling crops, community membership and technical assistance
- iii. To determine the impacts of ICTs tools and advancement;
 - in association with ICT
 - differential use of ICT
 - networking through ICT

- cultivation through ICT
- iv. To find out actual problems and obstacle of using ICT
- v. To explore the influences between the dependent and independent variables to calculate the effects of ICT on rural farmers.

1.4 Scope and Limitation of the study

The finding of the study will be particular applicable to the upazilas of Barishal Sadar, Amtoli, Charfasson, Nalchiti, Patuakhali Sadar, and Nesarabad of districts Barishal, Barguna, Bhola, Jhalokati, Patuakhali and Pirojpur respectively. However, the findings may also be applicable in other Bangladesh where the physical, socio-economic and cultural conditions do not differ much with those of the study area. Thus, the findings of the study may be profitable utilized by the planners, policy makers, extension personnel and field workers for successful planning and extension of programs aimed at effective communication of agricultural information to the farmers in general.

The purpose of the study was to have understanding about the impact of use of Information and communication technologies. However, in order to conduct the research in a meaningful and manageable way it becomes necessary to impose certain limitations in regard to certain aspects of the study. Considering the time, money and necessary resources available to the researcher the following limitations have been observed throughout the study.

1. The study was confined to one upazila of each district of Barishal division
2. Population for the present study was kept confined within the heads of the families of the farmers, because they were the major decision maker in their families.
3. Only hundred characteristics were selected for investigation in the study. But the characteristics of the farmers were many and varied.
4. The investigator depended on the data furnished by the selected farmers during their interview.
5. Information used by the farmers for various purposes such as farming, business, politics, religion etc. this study investigated the impact of use of ICTs as perceived by the farmers in receiving agricultural information related to cultivation.

6. Facts and figures collected by the investigator applied to the situation prevailing during the year 2019.

1.5 Assumptions

“An assumption is the supposition that an apparent fact or principle is true in the light of the available evidence” (Goode and Hatt, 1952). In this study, the researcher had the following assumptions in mind while running this study.

1. The respondents included in the sample were competent to give proper responses to the queries included in the interview schedule.
2. The researcher who acted as interviewer was well adjusted to the social and cultural environment of the study area. Hence, the data collected by him from the respondents were free from bias.
3. The responses furnished by the respondents were reliable and the respondents truly and freely expressed all facts concerning impact of ICTs use as perceived by them and their selected characteristics.
4. Views and opinions made by the respondents were representative of the whole population of the study area.
5. The researcher was capable to rate the responses of the farmers with adequate precision.
6. The findings of the study will have general application to other parts of the country where physical, socio-economic and cultural conditions do not differ much from the study area.
7. Impact of use of ICTs as perceived by the farmers was linearly related with their selected characteristics.

Study on the impact of information and communication technologies use as perceived by the farmers are conducted in very limited area of Bangladesh. A few studies in this regard have so far been conducted. Finding this study well, therefore, focus some light about the impact of ICTs use as perceived by the farmers is conducted in this part of the world. Thus, the study will add to the body of knowledge about the impact of information and communication technologies use as perceived by the farmers.

1.6 Definition of the Terms

Certain terms used throughout the study are defined below for clarity of understanding.

1.6.1 Information and Communication Technologies (ICTs)

ICT stands for Information and Communications Technology. In other words, it can mean almost anything that's new and relevant to communications. This includes the Internet, mobile telephone, satellite communications and digital television over cable or aerials. In this study only seven selected technologies (i.e., TV, Radio, Telephone, Mobile, Newspaper, Multimedia and Internet) have been taken into consideration.

1.6.2 Age

Age of a respondent is defined as the period of time in actual years from his birth to the time of interviewing.

1.6.3 Education

Education defined as the formal education received up to a certain level from an educational institute (e.g. school, college and university) at the time of interview.

1.6.4 Farm size

Farm size referred to the area of land possessed by a farmer through different land tenure system such as own land under own cultivation, land given other as barga, land taken from other as barga, land given lease, land taken as lease etc. Farm size was measured in terms of hectares.

1.6.5 Farmer's accommodational level

Accommodation of the respondent is the independent variable in which we collect data of house type, house roof, house floor and house wall in the category of paccha, semi paccha, tin shed, kacha ghor, kure ghor, cement, brick, bamboo, and soil.

1.6.6 Annual income

Annual income referred to the total earning of a respondent himself and the members of his family from agriculture and non- agriculture (services, business, etc.) sources during a year. It was expressed in Taka.

1.6.7 Annual expenditure

Annual expenditure of a respondent was measured on the basis of total yearly spending from family expences, agricultural and non-agricultural expenses (business, service etc) spent by the respondent himself and other family members. Respondent was asked about the total annual expenditure considering all expenses.

1.6.8 Source of market information

Source of market information is a key independent variable in which respondent was asked about the selling place, yields, crops market price, agricultural input price and loan services. We asked respondent how he/she get all the information related to market information.

1.6.9 Social participation

Social participation referred to the degree to which a farmer takes part in different social organization either as an ordinary member, executive committee member or executive officer within a specified period of time.

1.6.10 Use of ICT materials

Use of ICT materials referred the rate of using various ICT materials by the respondents.

1.6.11 Farmer's networking

Farmer's networking for cultivation is a variable in which media is related to conclude in a way to communicate with others. The media is related with ICT in which respondent was asked about the way of their networking. Farmer may have network among entrepreneurs, Suppliers, customers, development agency, private company, projects and international agency.

1.6.12 Cultivation information

Cultivation information of individual is one of the important factors which enumerate control of disease, post-harvest management, Output Processing, pest management, cattle vaccination, cultivating fish, maintain the quality of pond water.

1.6.13 Technical assistance

Respondent was asked about the technical assistance in which he get the adequate knowledge and support regarding to the cultivation, post-harvest management, selling of yields. Respondents may have technical support or assistance from DAE, input dealers, NGO, BADC, agricultural projects, media, university and innovative farmers.

1.6.14 Farming experience

Farming experience of a respondent defined as the period of time he practices agricultural work. It is calculated in actual years at the time of interviewing.

1.6.15 Community membership

Community membership of respondent is a factor in which respondents get different kinds of support and information. Respondents may have membership in IPM club, ICM club, common interest group, UP member, market management committee, organize market group, salish committee, NGO group member and cooperative society.

1.6.16 Agricultural knowledge

It was the extent of basic understanding of the farmers in different aspects of agricultural subject matters i.e. crops, livestock, fisheries, agro-forestry, soil, seed, fertilizer, insects and diseases of crops, high yielding variety etc. Agricultural knowledge of a respondent was measured by counting agricultural knowledge score.

REVIEW OF LITERATURE

The researcher made an elaborate search of available literature for this research. Available literatures were extensively reviewed to find out work in Bangladesh as well as abroad. The reviews are conveniently presented in accordance with the major objectives of the study. This Chapter is divided into three sections. First section deals with the concept on impact of information and communication technologies use and the second section is devoted to a discussion on the findings of studies exploring relationships between the selected characteristics of the clients and impact of information and communication technologies use as perceived by them. The third section presents the conceptual framework of the study.

2.1 Concept on Impact of Information and Communication Technologies use as perceived by the farmers

Kaini (2007) in a study found that ICTs was very important for developing agricultural sector. He found ICTs were very efficient in terms of time, cost and distance, developing agricultural programs through assisting access to new technologies, production inputs and market information.

ICT had it's direct and indirect effect for poverty alleviation. The main direct effect was higher profits from agricultural productions through adopting new technologies and indirect effect was employment generation through commercialization of agriculture.

Tanvir (2007) stated that ICTs for poverty alleviation through agricultural development was increasing rapidly. Electronic media which were far more effective in view of its high speed, vast range of coverage and particularly because it offers visual contents except in case of Radio.

Pandia et. al. (2002) conducted a study on the Impact of Video Education on Knowledge Retention and found direct positive effect with age, education, farming experience, economic motivation, mass media exposure, extension agency contact, involvement in decision making, innovativeness and direct negative effect with respondents' annual income, farm size, social participation.

kabir and Bhattachargee (1994) conducted a study on the Impact of Radio and Television on rural people and found that the responses regarding the impact of TV

programs were similar to responses regarding the impact of Radio broadcasts. All of the telecasts were of average benefit to most of the male and female audience. No one of the respondent started that many of the selected programs had adequate use to him or her. That the programs were of no use was said none of the female TV audience. Among the need-based telecasts “Apnar Shasthya” seemed to be the most effective program for male viewers. About 53 per cent of the male respondents watch this program. The next important one was “Mati-O-Manush”, which had 35.25 per cent audience.

Diaz-knauf et al. (1993) stated in a study on consumer attitude towards food safety of product in Costa Rica that information sources on which consumers rely are television (92%), radio (73%) and newspaper (63%). Laharia and Joshi (1992) found in a study on farm telecast viewing behavior of farmers in India that about two thirds of the respondents (total 100) reported the Krishi Darshan Program (KJDP) of Delhi Doordarshan Kenda was very useful. The study implied that the perception of usefulness increased with the increase in one’s periodicity of viewing the program.

Saianturi (1992) found in a study that Radio was the Highest rated source of agricultural information, followed by Television.

Papa (1991) conducted a study on intensity of extension contact and innovativeness of multiple cropping farmers in Philippines and the study showed that fifty four per cent of the farmers had high intensity of extension contact while only forty seven per cent had extent of innovativeness. The extension contact of leaching methodologies frequently preferred by the multiple cropping farmers were farm and home visit, leaflet, television, i general meeting and seminar / short course.

Allin-Ton (1991) reported by the mid-term review of the Fifth Malaysia Plan (198690) and has stated that emphasis would be placed on accelerating transfer of technology to small holders to improve their productivity and efficiency. Technology transfer could be achieved through publications, newspaper, radio, and television networks and interpersonal methods as exemplified program launched in 1983 by the Ministry of Agriculture which has contributed to increase farmers’ communication through the printed media. The advent of information technology had benefited Malaysia in the transfer of technology by reducing costs in terms of time. This seen in the rapidity with which information could be mass produced for dissemination by using desktop

publication which further allowed information transfer through the printed media to be expedited, thus bringing to the farmers new information quickly. This approach to publication was cost effective.

Singh and Sharma (1973) and Reddy (1986) conducted researches in India about dissemination of agricultural information through television and have reported significant impact of farm telecasts in increasing the technology knowledge of farmers and farm women.

Cherian and Chandra (1989) in their study had shown that rural women took interests in watching the television programs produced. The extent of watching the television programs was more frequent in case of men than women. The television helped women and men to gain significant amount of knowledge about green leafy vegetables, potato, vaccination and laparoscopy. The gain in knowledge was more among females than males.

Haque (1982) in a study with M. 99 farmers in the Philippines determined the perceived effectiveness of 10 communication media in which television was included. Farmers' perceived effectiveness was measured on a four point rating scale for each of the message trait-adequateness, understandability, applicability and persuasiveness. The comprehensive message trait-index of the television was observed as 311 which occupied ninth rank.

Reddy (1982) opined that with the help of new modes of communication like radio and television the research findings can be conveyed to the farmers quickly and in away that intelligibly eligible to them.

Chanhan and Sinha (1979) found in their study that TV alone is no doubt, capable of imparting knowledge to its audience by it became more effective then it combines with other channels like group discussion and / or printed matters and, the effectiveness, further increases with increase in the number of channels in combination employed to communicate to the farmers.

Parvez (1977) conducted a study on the radio listening habit and other related aspects of the farmers of the Bhabokhali union of Mymensing district. The finding of the study revealed a picture about the extent of use of radio by the farmers. The researcher found that 67 per cent of the farmers had high or medium exposure to Agricultural Radio

Program (ARP). This indicated that information be made available to the farmers through radio. Regarding the opinion of the farmers about the usefulness of ARP for agricultural work Parvez opined that 67 per cent of the farmers considered ARP very useful for agricultural work while 20 per cent considered the ARP useful. Thirteen per cent of the farmers expressed no opinion about the usefulness of ARP.

Singh and Sharma (1973) found in a study that the farmers of TV-villages were far ahead of their counterparts of non-TV group with respect to adoption of HYV wheat. The impact of TV was found all the conducive to small farmer and those without schooling. The specialized source credibility in TV-villages indicate a 'monomorphic' pattern in the information seeking behavior of farmers, while the polymorphic trend was found still prevalent among the farmers of non- TV villages. Sharma and Dry (1970) conducted a study on the relative effectiveness of radio and television in dissemination of agricultural information and from the study television was found to be significantly effective than radio in case of all the programs, with respect to gain and retention of knowledge, with lapse of time in case of both media and with all the programs. The average gain of knowledge was 30.95 per cent with the television viewers as against 21.92 per cent with radio listeners. Similarly the extent of average retention after 15 days exposure with TV viewers and radio listeners was 35.04 per cent and 16.12 per cent respectively.

Singh and Shankariah (1969) recommended an optimal use of all the mass media like television, radio, films, demonstration, and farmers' training camps.

Knox (1962) in a study in Barten county, Kansas found that there is seldom complete agreement among extension climate as to whether extension program can be made more effective by efficient use of available mass media, if so, which media are all respondents had radios and daily and weekly newspapers and 92 per cent of them had TV sets.

2.2 Relationship between the Selected Characteristics of the Farmers and impact of information and Communication technologies use as perceived by them

2.2.1 Age and impact of ICTs use

Shin and Evans (1991) found significant and positive relationship between age and impact of use of communication technologies. Pandian et. al. (2002) found that the age

farmers had direct positive effect between age of the farmers and Impact of use of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship between farmers' age and their perception of effectiveness of television programs.

Ahmed (1977) in his study found that age of the farmers had no significant influence on the use of various communication media in the adoption of improved farm practices.

Rahman (1974) observed no relationship between communication media and farmers age of registered jute seed growers.

Ullah (1996) observed that age of farmers showed a negative but not significant relationship with their use of different information media.

Khalil (1998) observed a negatively insignificant relationship between age of the farmers and their use of information sources in producing HYV Rice.

Rahman (1996) undertook an investigation on communication behavior of winter vegetable growers at Sherpur thana of Gazipur District. He reported that age had no relationship with communication behavior.

Sarker (1995) observed a negatively insignificant relationship between age of the small farmers and their use of communication media in receiving agricultural information.

Khan (1996) concluded that age of the farmers had a negative and insignificant effect on the use of information media.

Most of the research findings on age and impact of information communication technologies use showed that either the variables are of independent or they had negative relationships. This means that age of the farmers do not possess any significant influence upon their impact of information communication technologies use in receiving agricultural information as well as the farming practices.

2.2.2 Education and impact of ICTs use

Pandian et. al. (2002) found that education of the farmers had direct positive effect on the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship of farmers' education with their perception of effectiveness of television programs.

Ahmed (1977) found that education had no effect on the use of communication media in the adoption of recommended variety of jute, recommended dose of fertilizer but showed an effect of education on the use of communication media and the relationship was positive.

Hossain (1981) in his study found that there was no relationship of education of the farmers with their adoption of improved practices.

Bhuiyan (1988) showed that education had positive and significant contribution to the comprehensive use of information and communication media.

Rahman (1974) found that the level of education of the respondents had significant influence on various information and communication technologies.

Halim (1982) in his study on schooling, extension and agricultural production found that increase of educational level of the farm operators resulted increased per acre production of rice, jute and net farm income of the farm, but this positive trend between level of education and increased production tended to fall in those farms where the operator received more the secondary level of education. He found significant regression between level of formal schooling of the farm operator and per hectare production of jute and rice which also resulted significant increase in net farm income.

Kashem and Jones (1988) found in their study that education of the small farmers rendered significant positive correlation with their contact with information sources.

Rahman (1996) observed that education of the winter vegetable growers had moderate association with their use of different information sources. Ullah (1996) concluded in his study that education of the vegetable growers had positive and highly significant relationship with their use of information sources. This means that the more the education of the vegetable growers, the more was their impact of information and communication sources use for vegetable cultivation.

Anisuzzaman (2003) concluded that the education of the farmers had significant positive relationship with their use of information and communication media.

The above research findings suggested that in most of the cases level of literacy of the farmers encouraged them to maintain better contact with various information and

communication media which ultimately kept good impact of ICTs in receiving agricultural information.

2.2.3 Farm size and impact of ICTs use

Pandian et. al. (2002) found negative insignificant relationship and direct negative effect of respondent's farm size with on the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship between farmers' farm size and their perception of effectiveness of television programs.

Ahmed's (1977) study showed that farm size had significant influence on the use of information sources and communication media in the adoption of plant protection measures.

Bhuiyan (1988) found that the farm size had significant positive correlation with the use of information media in the adoption of selected improved farm practices in rice cultivation.

Hooda (1989) found that land holding of the farmers had positive and significant correlation with their communication behavior.

Sarker's (1995) study showed that farm size of the small farmers had a significant amount of influence upon their decision on using communication sources of information.

Rahman (1996) concluded in his study that farm size had moderate association with their use of information sources and communication media. Majority of the researchers opined that the farm size had relationship with their perceived impact of various information and communication technologies use and adoption of improved farming practices.

2.2.4 Annual income and impact of ICTs use

Pandian et. al. (2002) found positive significant effect of respondent's annual income with the Impact of Video Education on Knowledge Retention.

Huque (1982) found no significant relationship of farmers' annual income with their perception of effectiveness of television programs.

Latif (1974) observed a significant positive relationship between income of the farmers and their communication exposure.

Sawheny (1996) showed that income was positively related to use of different information sources and media.

Hossain and Crouch (1992) observed that farmers annual income had positive relationship with their use of mass media.

Uddin (1993) found that there was a relationship between annual income of the sugarcane growers and their reception of information in sugarcane cultivation.

Rahman (1996) found in his study that annual income of the winter vegetable growers had moderate association with their use of different information sources.

Karim (2005) found that income of the farmers had significant effect on the use of communication sources in receiving agricultural information.

Majority of the research findings indicated that the annual income of the farmers had significant relationship with their perceived impact of information and communication technologies use.

2.2.5 Social participation and impact of ICTs use

Pandian et. al. (2002) found negative insignificant relationship and direct negative effect of respondent's social participation with the Impact of Video Education on Knowledge Retention.

Chandra and Raddy (2004) found positive insignificant relationship of respondents' social participation with impact of use of television program.

On the basis of research finding mentioned above it may be concluded that the social participation may not have any effect of maintaining exposure with various information sources.

2.2.6 Use of ICT materials and impact of ICTs use

Reddy (1986) conducted researches in India about dissemination of agricultural information through television and have reported significant impact of farm telecasts in increasing the technology knowledge of farmers and farm women.

2.2.7 Farming experience and impact of ICTs use

Shin and Evans (1991) found significant and positive relationship between farming experience and impact of use of communication technologies.

Pandian et. al. (2002) found direct positive effect on the Impact of Video Education on Knowledge Retention with the Farming experience of farmers.

Chandra and Raddy (2004) found negative insignificant relationship of respondents Farming experience with their impact of television program.

Khalil (1998) mentioned in his study that farming experience of the farmers had low association with their use of different information sources.

2.2.8 Cosmopolitanism and impact of ICTs use

Hossain and Crouch (1992) reported that cosmopolitanism had positive relationship with the information sources.

Ullah (1996) in a study observed that cosmopolitanism of farmers had significant and positive relationship with their extent of use of information sources.

Rahman (1996) concluded that cosmopolitanism of the winter vegetable growers had moderate association with their use of different information sources.

Anisuzzaman (2003) observed in his study that cosmopolitanism of rice growers had significant positive effect on their use of information and communication media.

Considering the above-mentioned research finding it may be concluded that the cosmopolitanism of the farmer and their impact of various information and communication technologies use are dependent on each other.

2.2.9 Agricultural knowledge and impact of ICTs use

Paul (1989) found in his study that the knowledge gained by the farmers from different sources and also through their experience regarding different aspects of agriculture were related with attending of result demonstration meeting.

Kashem and Halim (1991) found in their study that agricultural knowledge had significant positive correlation with competence, belief and attitudes towards agricultural technologies, behavior intent, innovativeness, self- confidence cosmopolitanism, use of communication media in the transfer of modern rice technologies, use of communication media in livestock production, use of

communication media in fish culture and use communication media in adoption of total agricultural technologies.

Sarker (1995) in his study on communication media used by the small farmers in receiving agricultural information found that the agricultural knowledge of the farmers is highly correlated with their use of communication media in adopting new technologies.

Karim (2005) in his study on farmers' use of communication sources in receiving agricultural information found a significant positive relationship between knowledge of the farmers and their communication sources used in improving cultural practices.

This means that agricultural knowledge of the farmers played an important role in receiving information on farming practices. Therefore, it may be concluded that agricultural knowledge of the farmers influences them to maintain various information and communication technologies for receiving information on improved farm practices.

2.2.10 Innovativeness and impact of ICTs use

Pandian et. al. (2002) found direct positive effect on the Impact of Video Education on Knowledge Retention with the innovativeness of farmers.

Rahim (1963) concluded in his study that adoption of improved farming practices/agricultural technology by the farmers was positively related to their contact with communication media.

Beal and sibley (1967) found that there was a positive relationship between communication behavior of the Indian Guatemala and their adoption of agricultural technology.

Kashem and Halim (1991) found in their study that innovativeness of the farmers had significant positive correlation with their (farmers) self-confidence, use of communication media in adoption of modem rice technology, use of communication media in livestock production, use of communication media in adoption of total agricultural technology.

2.3 The Conceptual Framework of the Study

In scientific research, selection and measurement of variables constitute an important task. The hypothesis of a research while constructed properly contains at least two

important elements i.e. "a dependent variable" and " an independent variable". A dependent variable is that factor which appears, disappears or varies as the researcher introduces, removes or varies the independent variables. An independent variable is that factor which is manipulated by the researcher in his attempt to ascertain its relationship to an observed phenomenon.

2.4 The concept of information and Communication Technology (ICT)

Information and communication technology (ICT) is a new concept with no agreed definition yet. There are however several definitions from different scholars.

According to Dixon (2003), information and communication technology (ICT) is synonymous with the micro-electronic revolution, Chesterton (1992), perceived information and communication technology in term of the application of science to information handling. Zorkoozy,(2000),information and communication technology has been describe as the collective storage, processing and dissemination of ideas information and communication technology is a core issue in any educational system.

Clement (1995), defined information and communication technology as the combination of electronic technology and advanced telecommunication were data can be stored and transmitted such as television, computer, satellite, tax and telephones.

Nevertheless, Fease(2003) , aware of these technologies and their benefits, quoted James Matins as authority in computing saying, we are at one of the most extra-ordinary moments in human history, rather than drafting into nuclear catastrophe, we have the opportunity to use the rapid development in technology and better society. Osuagwu (1999), describe information and communication technology as the convergence of tools of micro-electronics, telecommunication and computers.

2.5 Trend in Information Technology (IT)

Information technology is not entirely a new idea as technology has been applied to information for a very long time and has created a lot excitement lately because of the rapid advances in technology that is associated with micro-processors.

According to Popky (1982), information technology (IT) is a product of information revolution, which started with three key motivations, the type writer, the telephone and

computer, since then information technology (IT) has expanded the use of these basic instruments.

The bedrock of information technology is computer, according to Long (1991), computer is the driving forces behind our- transition into an information society. Harrison (1997), defined a computer as anything capable of automatically accepting data, applying a sequence of process to data and supplying the result since then information technology result of these processes.

Aromolaram (1993), describe the computer as an electronic machine that stores or process data or information. Computer has helped man to be active participant in emerging an information and communication technology society.

The internet is described as a global collection of many different computer networks linked together. According to Nwosu (1999), the internet is described as an information sub-highway; beginning from the 1990s, the internet revolutionary changed the supply of technology, also in education. The internet offered a tool for discussion and publishing, it offered better e-mail application and it is a huge information source for searching.

2.6 The Effect of Information and Communication Technology on Study Habit.

The world is moving at an unimaginable speed in the areas of information dissemination (Okiki, 2011). Current achievements in the field of computer and information technologies have now offered tremendous opportunities for learning by electronic means (Roziing, 2002). The use of information and communication in universities is seen as a means to improve accessibility, efficiency and quality of learning by facilitating access to information resources and services. According to Abimbade (2005), the world of technology has continued growth and the world has become a global village.

Kumar and Kaur (2005), states that the current information revolution and increasing impact of information and communication technology have modernized the process of learning and research in most universities. Ramza (2004) observed that expert systems,

wireless networks, Virtual collections, interactive web interfaces, virtual references services, and personal web-portals have brought changes since the start of the new millennium.

Isalam and Panda (2007) states that the application of the web-based information retrieval trends of researchers is ever increasing and the electronic material will eventually replace the traditional library and user need not go there to find and there to find and collect information they need.

Ansari (2006), focused on the internet use by the faculty including purpose of use, impact on teaching and research, internet resources that they use and the problem faced while using internet help save time and contain up-to-date information.

Bemah (2002) stated that the exponential growth in information and knowledge and the corresponding increase in users needs have stipulated a greater degree of technological inventions and strategies towards the management, transmission / dissemination, organization and the use of information.

Walson (1993) showed that students spend longer time in the learning task when they use ICT. Boolian (1994) discovered that students who use ICT develop new strategies for problem solving, and also develop higher order thinking skill (Carthart, 1990).

These findings are all reported by Aremu (2001.), Afolabi (2009) observed that a random sampling of ICT in the universities in Nigeria shows that the prospect of ICT and the ideal situation of educational research in our ICT driven campus is still a mirage.

Auwal (2009), in his own view, opined that there is some unique attributes offered by ICT such as for reducing isolation, facilitating dialogue, participation and fostering interactive networks. He went further to observe that those using ICT can be producers of their own information and not just being positive recipients. Research findings have shown that information and communication technology help student to learn better and enhance their performance.

2.7 Summary of Literature Review

The available literatures reviewed so far revealed that information and communication technology have tremendous effect on student study habit, as it prepares a wide range of student for the technological through the implantation of a curriculum frame work based on technological system.

The reviewed literature shows that although several meaning of information and communication technology exist, no generally accepted definition has been arrived at, although most of the definition seem to be narrowly presented, that which is comprehensive and seems to be relevant to this study is that ICT is simply the tool and method used for identification organization and manipulation of facts known as data. ICT involves not just the use for computers but telecommunication and media facilities in the processing, transfer and display of information. Information and communication involve all technology used in sending and receiving information in the institution.

From the reviewed literature, the researcher observed study habit can be viewed as an habitual attitude which involves note taking, private/ group home work and assignment, make up for missed note, teachers student interaction, reading materials, family school responsibilities, teacher consultation, maximum attention in written work, internet skill.

The researcher also observed from the reviewed literature that the bedrock of information technology is the computer which is the driving force behind our transition into an information society. The researcher in his view of related literature saw the effect of information and communication technology (ICT) on study habit of student research findings have shown that ICT has helped student relearn better and has enhanced performance.

METHODOLOGY

Methodology deserves a very careful consideration in conducting scientific research. Importance of methodology in conducting any research cannot be undermined. Methodology enables the researcher to collect valid and reliable information and to analyze them properly to arrive at correct decisions. Keeping this point in view, the researcher took utmost care for using proper methods in all the aspects of this piece of research work. Methods and procedures followed in conducting this study has been described in this chapter.

3.1 Selection area

Barishal division was purposefully selected as locale of the study. It has 6 districts of Barishal, Barguna, Bhola, Jhalokati, Patuakhali and Pirojpur. Barishal Sadar, Amtoli, Charfasson, Nalchity, Patuakhali Sadar and Nesarabad upazilas were purposively selected for collecting the data. We chose all the districts but only one upazila of each district.



Figure 3-1: Map of the Barishal Division

3.2 Population and Sampling Design

We had selected all the districts of Barisal division but only one upazila in each district. We randomly selected Barishal Sadar, Amtoli, Charfasson, Nalchity, Patuakhali Sadar and Nesarabad upazilas from other upazilas of each district for conducting the survey. In addition to that, samples of 16 and 17 were selected randomly and proportionately from each of selected upazillas. Thus, the additional sample, so drawn stood 10 farmers, which were included in the reserve list. In case, the individuals included in the original samples were not available or not found suitable at the time of data collection, the farmers of the reserve list were used for the purpose. The distribution of the farmers included in the population, sample and those in the reserve.

Distribution of population and sample of respondents in selected districts of Barishal division		
District	Upazilla	Sample
Barishal	Barishal Sadar	17
Patuakhali	Patuakhali Sadar	17
Bhola	Charfassin	16
Borguna	Amtoly	16
Jhalokathi	Nalchity	17
Pirojpur	Nesarabad	17
Total		100

Source: Field Survey, 2019

Table 3-1: Distribution of population and sample of respondents in selected districts of Barishal division

3.3 Method of data collection

For the purpose of data collection, an interview schedule was prepared. It was prepared keeping the objectives of the study in mind. The schedule contained both open and closed form questions. Direct simple questions were included in the schedule to collect data on the selected dependent and independent variables. Appropriate scales were developed to measure the selected factors of the respondents. Scales were also developed to ascertain the impact of ICTs use. The draft schedule was prepared in Bengali and pretested before using it for collection of data. For pretest purpose, sixteen or seventeen farmers taken from the selected village of the study area were interviewed by using the draft interview schedule. Based on the pre-test experience, necessary corrections, additions, alternations and rearrangements were made in the schedule.

Thus, the schedule was prepared for final use. The schedule was prepared both in Bengali and English version. The Bengali version of interview schedule was multiplied as per requirements to collect data from the respondents. The English version of interview schedule was enclosed in appendix A. Data were collected personally by the researcher himself through face-to-face visit to all the farmers of selected upazilas to obtain valid and pertinent information. The researcher made all possible efforts to explain the purpose of the study to the farmers. Rapports were established with the farmers prior to interview and the objectives were clearly explained by using local language to the extent possible. So, he did not hesitate to furnish proper responses to the questions and statements which were collected during 3th November to 10th December, 2019. At the time of data collection, the researcher was also aware of side talking and tried to avoid that problem tactfully. The researcher sought the help of the local supervisors for this purpose. Excellent co-operation and coordination were obtained from all the respondents.

The collected raw data were examined thoroughly to find out the errors and omissions. For this, the researcher made a careful scrutiny of the completed interview schedule to make sure that they were entered as complete as possible and well arranged to facilitate coding and tabulation. Very minor mistakes were detected by doing this, which were corrected promptly.

Having consulted with his research supervisor, the investigator prepared a detailed coding plan. All responses in the interview schedule were given numerical coded values. Local units were converted into standard units. All the individual responses to the questions of the interview schedule were transferred to a master sheet to facilitate tabulation. In case of qualitative data, appropriate scoring technique was followed to convert the data into quantitative forms. These were then tabulated according to the objectives of the study. For describing the various independent and dependent variables, the respondents were classified into various categories and arranged in simple table for description. These categories were developed for each of the variable by considering the nature of distribution of the data and the general consideration prevailing in the social system. The procedure and the effect of categorization of a particular variable were discussed while describing the variable in the subsequent sections.

3.4 Statistical Analysis

3.4.1 Data Analysis

Raw data are used for quantitative analysis. Hence, collected data were analyzed using SPSS. Descriptive statistics including frequency, percentages and mean values were computed for meaningful transition of results. Qualitative data obtained from farmers were analyzed through content analysis technique. This qualitative data was used to validate the collected quantitative data from farmer respondents.

3.4.2 Model Specification

Regression analysis is a quantitative research method which is used when the study involves modelling and analysing several variables, where the relationship includes a dependent variable and one or more independent variables. In simple terms, regression analysis is a quantitative method used to test the nature of relationships between a dependent variable and one or more independent variables. The multiple regression model is

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k + U_i$$

Methods of correlation and regression can be used in order to analyze the extent and the nature of relationships between different variables. Correlation analysis is used to understand the nature of linear relationships between two individual variables. The Pearson product-moment correlation is calculated by taking the ratio of the sample of the two variables to the product of the two standard deviations and illustrates the strength of linear relationships. In Pearson product-moment correlation the correlation coefficient is not robust due to the fact that strong linear relationships between the variables are not recognized. The correlation coefficient is sensitive to outlying points therefore the correlation coefficient is not resistant. The calculation of the correlation coefficient is as follows

$$r_{xy} = \frac{\sum x_i y_i - \frac{\sum x_i \sum y_i}{n}}{\sqrt{\left\{ \sum x_i^2 - \frac{(\sum x_i)^2}{n} \right\} \left\{ \sum y_i^2 - \frac{(\sum y_i)^2}{n} \right\}}}$$

Understanding and quantifying the relationship between categorical variables is one of the most important tasks in data science. This is useful not just in building predictive models, but also in data science research work. One statistical test that does this is the *chi-square test of independence*, which is used to determine if there is an association between two or more categorical variables. The relationship between the attributes in a contingency table is termed as association. If the association between the attributes is insignificant, the attributes are said to be independent. Independence of attributes in contingency tables are tested using χ^2 (chi-square) statistic and the test is known as χ^2 test of independence. The null hypothesis may be stated as

H_0 : There is no association between two attributes

The test statistic is

$$\chi^2 = \sum_i \sum_j \left\{ \frac{(O_{ij} - E_{ij})^2}{E_{ij}} \right\} = \sum_i \sum_j \frac{O_{ij}^2}{E_{ij}} - N$$

has χ^2 distribution with $(m-1)(n-1)$ d.f.

Here E_{ij} is the expected frequency of the ij -th cell, i.e. for the j th category of B in the i th category of A. E_{ij} is obtained as

$$E_{ij} = \frac{A_i \times B_j}{N}$$

A paired t-test is used to compare two population means where we have two samples in which observations in one sample can be paired with observations in the other sample. Examples of where this might occur are:

- Before-and-after observations on the same subjects (e.g. rice yield of farmers' before and after using ICT).
- A comparison of two different methods of measurement or two different treatments where the measurements/treatments are applied to the same subjects

For testing the null hypothesis $H_0: \mu_x = \mu_y$, the test statistic is

$$t = \frac{\bar{d} - \mu_d}{s_d / \sqrt{n}} \text{ with } (n-1) \text{ d.f.}$$

RESULTS AND DISCUSSION

A sequential and detailed discussion on the findings of the study has been presented in this Chapter. The Chapter is divided into nine sections. In the first section, socio-economic characteristics of the respondents have been discussed. The second section dealt with statistics on selling crops. The third sections dealt with farmers' networking category through ICT. The fourth section dealt with statistics on ICT tools and their advancements. The fifth section described about the ICT and Cultivation. The sixth section dealt with problem and obstacle regarding ICT. The seventh section discussed about farmers' current membership in their locality. The eighth section dealt with farmers' direct access to technical assistance. Last but not the least, impacts of ICT advancement had been categorized through crosstabulation, t-test, regression analysis and coefficients.

4.1 Socio-economic characteristics farmers

4.1.1 Age

Table 4-1: Frequency table of age distribution of farmers

Ranges	No. of farmers	Percent
20-30	7	7.0
30-40	24	24.0
40-50	37	37.0
50-60	26	26.0
60-70	6	6.0
Total	100	100.0

Source: Field Survey, 2019

Table 4-1 reveals that, the ages of the farmers ranged from 20 to 70 years which are divided into 5 age groups. According to Table 4-1, 7%, 24%, 37%, 26%, 6% of the participants were from 20-30, 30-40, 40-50, 50-60, 60-70 age groups respectively. So, majority farmers (37%) were from 40 to 50 years old.

4.1.2 Educational status

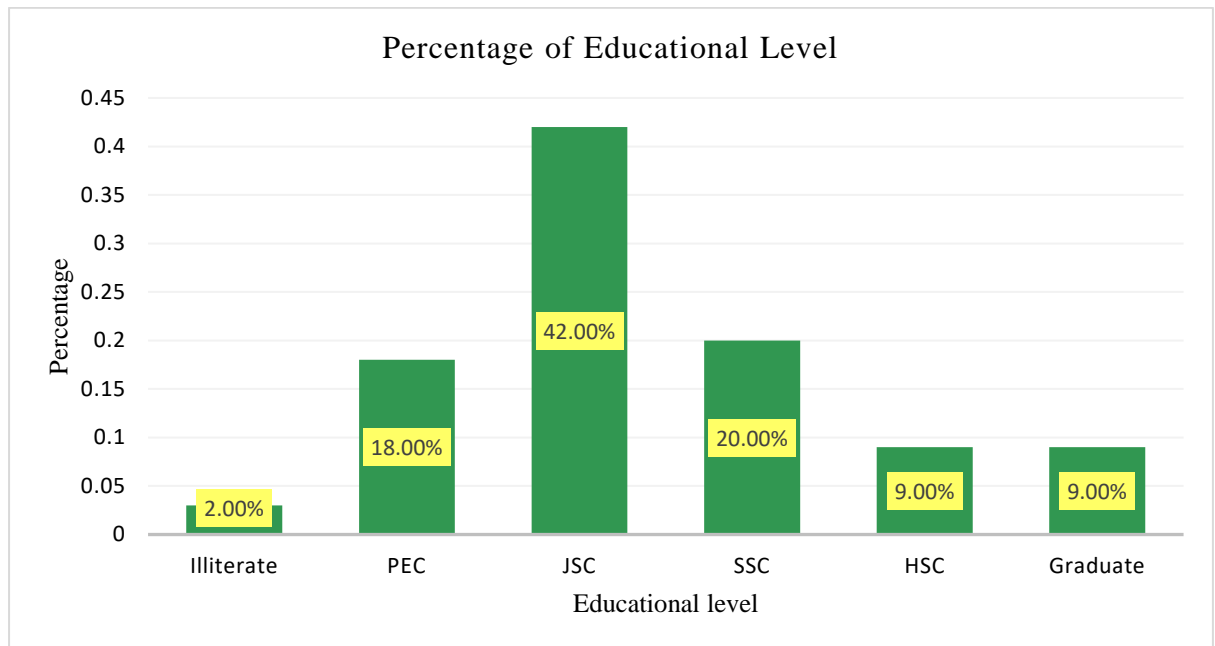


Figure 4-1: Percentage of farmers' education level

According to figure 4-1 the lowest few participants (2%) were illiterate while the educational level of most of the participants (42%) was JSC. Again, 20% and 18% of the participants consisted SSC and PEC groups respectively while the higher educational levels (HSC, Graduate and above) were completed by only 9% each.

4.1.3 Land Ownership

4.1.3.1 Owning land

During the study, respondents were asked about the survey when respondent had their land to cultivated. So, all the respondents had their land to cultivation.

Table 4-2: Descriptive statistics of different types of used land by farmers.

Indicators	N	Mean		Skewness		Kurtosis	
		Mean	Std. Error	mean	Std. Error	Mean	Std. Error
Own land	100	60.64	2.18	.91	.24	1.49	.47
Rented in	100	.15	.15	10.00	.24	100.00	.47
Mortgaged in	100	.85	.32	4.05	.24	16.80	.47
Leased in	100	1.22	.59	6.49	.24	48.56	.47
Shared in	100	2.86	.57	1.79	.24	1.93	.47

Source: Field Survey, 2019

According to this table, on the average the participants had 60.64 decimal lands. From skewness statistics in the table it can be said that the distribution of the land among the participants is not symmetric that the data set is not normally distributed. It is moderately skewed. And from kurtosis statistics in the table it is observed that this distribution has less outliers than normal distribution.

Again, from this table it is visualized that the 'rented in land' had an average of .15 decimal. Skewness statistics says that this distribution is not symmetric that is the data set for this purpose is not normally distributed. It is highly skewed. Kurtosis statistics for this purpose tells that distribution has more outliers than normal distribution.

In case of 'mortgaged in' descriptive statistics shows that, the lands that were mortgaged in had an average of .85 decimal. Skewness statistics says that this distribution is not symmetric that is the data set for this purpose is not normally distributed. It is highly skewed. Kurtosis statistics for this purpose tells that distribution has more outliers than normal distribution.

In case of 'leased in' lands, descriptive statistics shows that, the lands that were leased in among the participants with an average of 1.22 decimal. Skewness statistics says that

this distribution is not symmetric that is the data set for this purpose is not normally distributed. It is highly skewed. Kurtosis statistics for this purpose tells that distribution has more outliers than normal distribution.

In case of ‘shared in’ lands descriptive statistics shows that, the lands that were shared in among the participants with an average of 2.86 decimal. Skewness statistics says that this distribution is not symmetric that is the data set for this purpose is not normally distributed. It is highly skewed. Kurtosis statistics for this purpose tells that distribution has less outliers than normal distribution.

Table 4-3: Descriptive statistics of homestead garden

Indicators	N	Minimum	Maximum	Mean	Std. Error
	Statistic	Statistic	Statistic		
Size of homestead garden	100	.00	20.00	10.06	.36
N	100				

Source: Field Survey, 2019

Table 4-3 shows that, participants owned various amounts of homestead garden ranging from .00 decimal to 20 decimals. On the average the participants had 10.06 decimal homestead garden. From skewness statistics in the table it can be said that the distribution of the land among the participants is approximately symmetric that is the data set is normally distributed. And from kurtosis statistics in the table it is observed that this distribution has less outliers than normal distribution.

4.1.4 Residential description of the farmers

4.1.4.1 House structure

Table 4-4: Frequency table of house structure of farmers

House structure	No. of Farmers	Percent
Pucca	18	18.0
Semi-Pacca	71	71.0
Tin Shed	9	9.0
Katcha	2	2.0
Total	100	100.0

Source: Field Survey, 2019

From Table 4-4, it can be observed that, the majority (71%) among the participants were living in ‘semi-pacca’ house. 18% of the participants had the house structure of ‘pucca’. Only few among the participants were living in ‘tin-shed’ (9%) and ‘katcha’ (2%) house.

4.1.5 Availability of ICT

Table 4-5: Frequency table of the users and nonusers of ICT

ICT Tools	Yes (%)	No (%)	Total
Mobile	100	0	100
Radio	83	17	100
Television	97	3	100
Computer	28	72	100

Source: Field Survey, 2019

From table 4-5, it had come to the light that, all the participants (100%) were the users of mobile phone. This table also shows us that, 83% of the total sample had radio and the rest 17% did not have any radio. This table describes that, 97% of the participants had televisions of their own and only 3% did not have any which indicates that after the mobile phone, television occupies a significant importance in farmers' life. This table indicates that, a quite small percentage (28%) of total sample was using computer which was of their own while a large part of the sample (72%) was deprived of having computer of their own.

4.1.6 Annual Income Distribution of Farmers

Table 4-6: Annual Income Distribution of Farmers

Income in TK.	No. of Farmers	Percent
0-50000	5	5.0
50000-100000	69	69.0
100000-150000	17	17.0
150000 and above	9	9.0
Total	100	100.0

Source: Field Survey, 2019

From Table 4-6, it can be depicted that, majority 69% farmers' annual income is between 50000 to 100000 TK. 17% farmers' annual income is between 100000 TK to 150000 TK. 5% farmers' annual income is below 50000 TK. And, 9% farmers' annual income is above 150000 TK.

4.1.7 Statistics of annual income and expenditure

Table 4-7: Descriptive statistics of annual income and expenditure

Indicators	N	Mean	Std. Deviation
Household total annual income in Agriculture after using ICT	100	45970.0000	22024.98810
Household total annual income in Agriculture before using ICT	100	39080.0000	18820.08383
Household total annual income in Others	100	51320.0000	21846.51695
Household total expenditure in Agriculture	100	15644.0000	20954.15544
Household total expenditure in Others	100	53460.0000	19793.08113
N	100		

From the mean and standard deviation of table 4-7, it can be observed that ICT had a positive effect on household total annual income in agriculture since this income is observed to increase after using ICT. Again, it can also be observed that in agriculture, household total expenditure was much less ($M=15644.0000$, $SD=19793.08113$) than the household total expenditure in others ($M=53460.0000$, $SD=19793.08113$). Also, it was observed that, household total annual income in others was somewhat less ($M=51320.0000$, $SD=21846.51695$) than household total expenditure in others ($M=53460.0000$, $SD=19793.08113$) whereas household total expenditure in agriculture was less than household total income in agriculture both before and after using ICT.

4.2 Statistics about Selling Crops

4.2.1 Percentage of participants who sell crops

Table 4-8: Frequency table of selling surplus crops

Indicators	Frequency	Percent
Yes	95	95.0
No	5	5.0
Total	100	100.0

Source: Field Survey, 2019

This table shows that, majority of 95% of the participants were engaged in selling surplus crops whereas only 5% replied in negative that they were not engaged in selling surplus crops.

4.2.2 Marketing of crops

Table 4-9: Frequency table of accomplishing marketing agricultural products

Indicators	Frequency	Percent
Self-marketing	64	64.0
Through salesman	30	30.0
Other ways	6	6.0
Total	100	100.0

Source: Field Survey, 2019

This table visualizes that, majority of the participants (64%) used to accomplish marketing agricultural products through self-marketing and minority (30%) did this through salesman. Only 6% were the users of other ways except self-marketing and salesman.

4.2.3 Different Selling place of crops by gender

4.2.3.1 Selling crops at house

Table 4-10: Frequency table of selling crops at house

Indicators	Frequency	Percent
Husband	37	37.0
Both	63	63.0
Total	100	100.0

Source: Field Survey, 2019

This table says that, in maximum cases (63%) both husband and wife sold crops at house. Again in 37% of the cases only husband used to sell crops at house.

4.2.3.2 Selling crops at field

All the respondents had revealed that they were engaged in selling crops at field.

4.2.3.3 Selling crops at Local market

All the farmers had replied similar to the selling crops at field, in all cases (100%) they used to sell crops at local market.

4.2.3.4 Selling crops at Wholesale market

Farmers replied during the survey that, in all cases they sold crops at wholesale markets.

4.2.4 Organized group

Table 4-11: Frequency table of organized group for selling crops

Indicators	No. of farmers	Percent
Yes	80	80.0
No	20	20.0
Total	100	100.0

Source: Field Survey, 2019

For the 80% of the participants there were organized groups for selling crops and for the rest 20% there was no organized group for selling crops.

4.3 Networking through ICT

Table 4-12 reveals that, majority of 95% of the participants were involved in networking with customer through mobile. The use of extension worker (1%), internet (3%) and others (1%) were very negligible. According to table 4-17, Networking among entrepreneurs was conducted widely using mobile (95%). Again, the use of other sources, such as internet (4%), others (1%), was very much negligible.

According to table 4-12, Networking among suppliers was conducted widely using mobile (91%). Again, the use of other sources, such as radio (2%), extension worker (2%), internet (4%), others (1%), was very much negligible.

According to table 4-12, Networking among development agency through ICT and electronic media was conducted widely using extension worker (29%). Again, the use of other sources, such as radio (10%), TV (12%), Mobile (24%), internet (19%), others (6%), was also observed.

According to table 4-12, Networking among private company through ICT and electronic media was conducted widely using extension worker (31%). Again, the use of other sources, such as radio (12%), TV (12%), Mobile (16%), internet (21%), others (8%) was also observed.

According to table 4-12, Networking among projects through ICT and electronic media was conducted widely using extension worker (33%). Again, the use of other sources, such as radio (11%), TV (13%), Mobile (15%), internet (19%), others (9%) was also observed.

Table 4-12: Frequency table of networking through ICT and electronic media

Indicators	Radio	Television	Mobile	Extension Workers	Internet	Others	Total
Networking with customer	0	0	95	1	3	1	100
Networking with entrepreneur	0	0	95	0	4	1	100
Networking with suppliers	2	0	91	2	4	1	100
Networking with development agency	10	12	24	29	19	6	100
Networking with private company	12	12	16	31	21	8	100
Networking with projects	11	13	15	33	19	9	100
Networking with international agency	12	14	15	32	19	8	100

Source: Field Survey, 2019

According to table 4-12, Networking among projects through ICT and electronic media was conducted widely using extension worker (32%). Again, the use of other sources, such as radio (12%), TV (14%), Mobile (15%), internet (19%), others (8%) was also observed.

4.4 Statistics about use of different ICT tools and their advancements

4.4.1 Regularly watching tv

Table 4-13: Frequency table of watching television regularly

Indicators	Frequency	Percent
Yes	69	69.0
No	31	31.0
Total	100	100.0

Source: Field Survey, 2019

From this table we can say that, 69% of the participants watched television regularly. On the other hand, 31% reported not watching television regularly.

4.4.2 Preferable TV programs

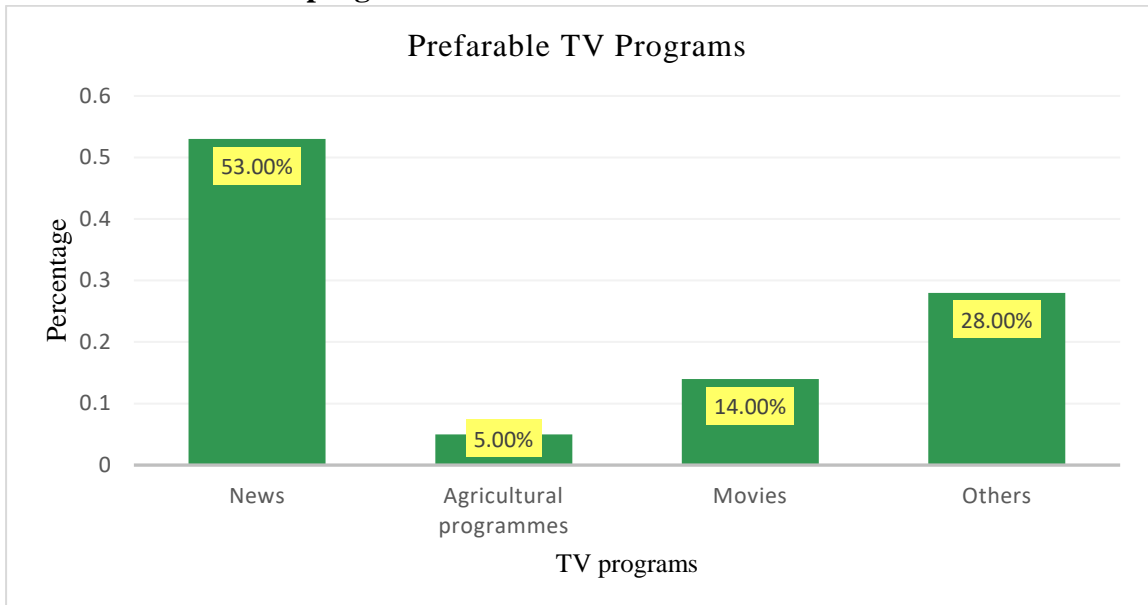


Figure 4-2: Percentage of preferable TV programs

According to this figure, most of the participants (53%) watch news programs on T.V. 14% of the participants watch movies while 28% watch other types of programs. Most surprisingly, only 5% of the participants reported that they watched agricultural programs.

4.4.3 Reasons of using mobile phone

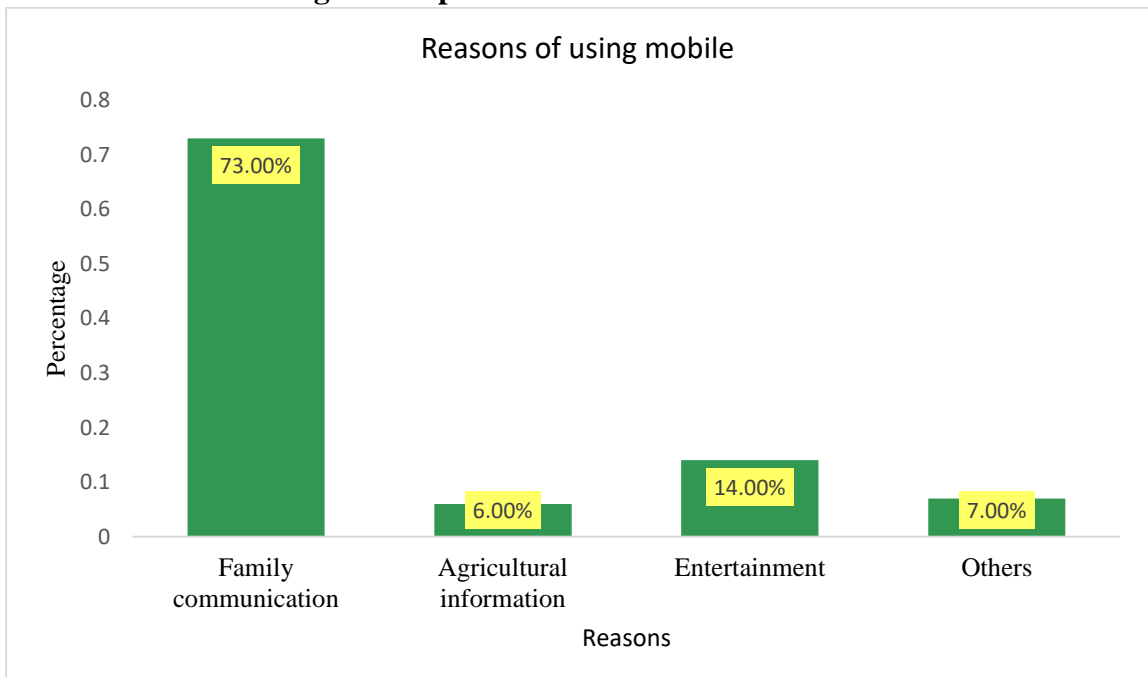


Figure 4-3: Reasons of using mobile

According to this figure 4-3, most of the participants (73%) reported that they used mobile phones for family communication. 14% of the participants reported using mobile phones for entertainment while 7% used mobile phones for other purposes. In case of using mobile phones, here we can also see the same picture as in case of using T.V. that lowest percentage (6%) used mobile phones for getting agricultural information.

4.4.4 Program to listen in radio

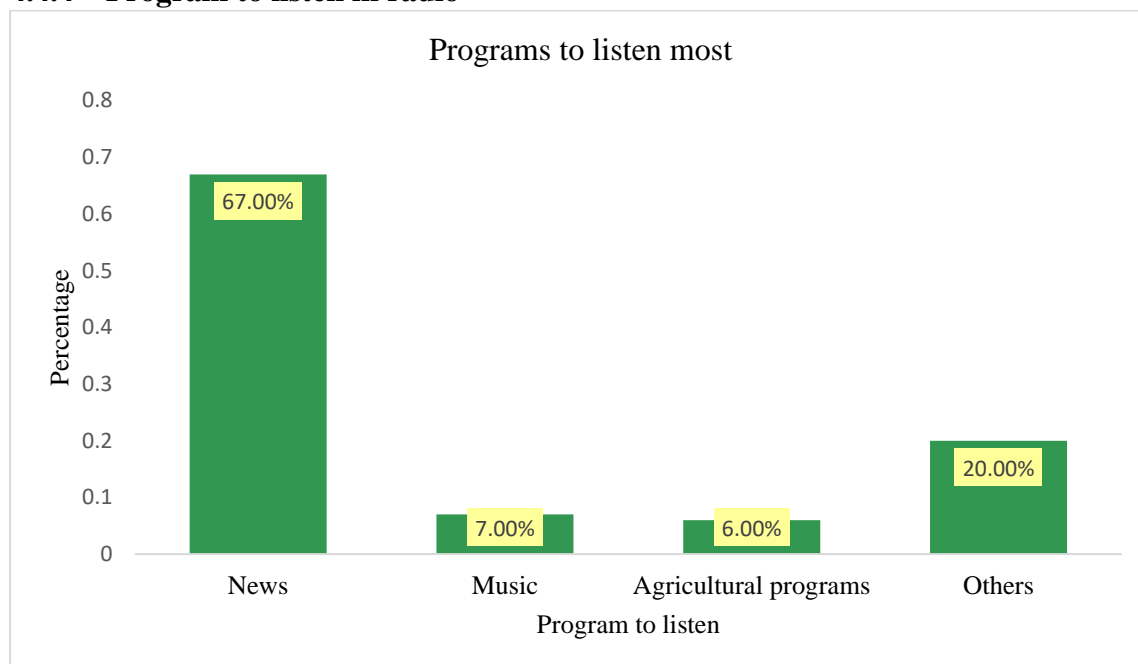


Figure 4-4: Percentage of Programs listen most

This figure says that, highest percentage (67%) of the participants would like to listen to ‘News’. We can also see that 7% of the participants were the listeners of ‘music’. Also, 20% listened to other types of programs. But surprisingly, only 6% listened to the programs related to agriculture.

4.4.5 Call centers

Table 4-14: Frequency table of having call center in locality

Indicators	Frequency	Percent
Yes	30	30.0
No	70	70.0
Total	100	100.0

Source: Field Survey, 2019

Table 4-14, says that, according to 70% of the participants there was no call center in their locality and according to rest of the participants (30%) there was call center in their locality.

4.4.6 Differential use of ICT sources

Table 4-15: Purpose of getting information through ICT uses

Indicators	Radio (%)	Television (%)	Mobile (%)	Extension Workers (%)	Internet (%)	Others (%)	Total (%)
Getting information regularly about weather forecast	13	16	48	1	20	2	100
Getting market information	12	16	48	3	20	1	100
Getting information about production input	11	14	51	3	19	2	100
Getting information of Loan services	13	13	44	10	19	1	100
Knowing post-harvest information	11	7	21	42	12	7	100
Knowing control of disease	7	5	9	63	10	6	100
Knowing the Output Processing	6	6	10	58	12	8	100
Getting information related to pest management	4	3	8	69	9	7	100

Source: Field Survey, 2019

4.4.6.1 Purpose of weather forecast

According to table 4-15, most of the participants (48%) used to get weather forecast through mobile phones. Also, internet, TV, radio, extension worker and other are the sources through which 20%, 16%, 13%, 1%, 2% of the participants reported of getting weather forecast respectively.

4.4.6.2 Purpose of Market information

According to table 4-15, most of the participants (48%) used to get market information through mobile phones. Also, internet, TV, radio, extension worker and other are the sources through which 20%, 16%, 12%, 3%, 1% of the participants reported of getting market information respectively.

4.4.6.3 Purpose of getting production input

According to table 4-15, most of the participants (51%) used to get production input through mobile phones. Also, internet, TV, radio, extension worker and other are the sources through which 19%, 14%, 11%, 3%, 2% of the participants reported of getting product input respectively.

4.4.6.4 Purpose of getting knowledge of Loan services

According to table 4-15, most of the participants (44%) used to get knowledge of loan service through mobile phones. Also, internet, TV, radio, extension worker and other are the sources through which 19%, 13%, 13%, 10%, 1% of the participants reported of getting knowledge of loan service respectively.

4.4.6.5 Purpose of knowing post-harvest information

According to table 4-15, most of the participants (42%) used to get knowledge of post-harvest information through extension workers. Also, internet, TV, radio, mobile phones and other are the sources through which 12%, 7%, 11%, 21%, 7% of the participants reported of getting knowledge of post-harvest information respectively.

4.4.6.6 Purpose of knowing control of disease

According to table 4-15, most of the participants (63%) used to get knowledge of controlling disease through extension workers. Also, internet, TV, radio, mobile phones and other are the sources through which 10%, 5%, 7%, 9%, 6% of the participants reported of getting knowledge of controlling disease respectively.

4.4.6.7 Purpose of knowing the output processing

According to table 4-15, most of the participants (58%) used to get knowledge of output processing through extension workers. Also, internet, TV, radio, mobile phones and

other are the sources through which 12%, 6%, 6%, 10%, 8% of the participants reported of getting knowledge of output processing respectively.

4.4.6.8 Purpose of getting the information related to pest management

According to table 4-15, most of the participants (69%) used to get knowledge of the information related to pest management through extension workers. Also, internet, TV, radio, mobile phones and other are the sources through which 9%, 3%, 4%, 8%, 7% of the participants reported of getting information related to pest management respectively.

Table 4-16: Frequency table of testing soil of the land

Indicators	Frequency	Percent
Yes	53	53.0
No	47	47.0
Total	100	100.0

Source: Field Survey, 2019

According to table 4-15, 53% answered in the positive that they tested soil of the land they cultivated while 47% answered in the negative.

Table 4-17: Frequency table of institution testing the soil

Indicators	Frequency	Percent
SRDI	50	50.0
NGO	45	45.0
Others	5	5.0
Total	100	100.0

Source: Field Survey, 2019

This table shows that in 50% cases SRDI tested the participants' soil. NGO tested the soil of 45% participants. Again, in case of only 5%, other institutions tested their soil.

4.5 ICT and Cultivation

4.5.1.1 Cultivation related to fisheries

Table 4-18: Frequency table of cultivating fish

Indicators	Frequency	Percent
Yes	85	85.0
No	15	15.0
Total	100	100.0

Source: Field Survey, 2019

Table 4-18 says that, 85% of the participants cultivated fish while the rest (15%) were not engaged in cultivating fish.

Table 4-19: Frequency table of collecting information about hatchling, quality feed and others

Indicators	Radio	Television	Mobile	Extension Workers	Internet	Others	Total
Collecting information about hatchling, quality feed and others	21	15	31	14	17	2	100
Collecting information about quality fingerling	18	13	29	19	17	4	100
Source of information in using fertilizer in proper way in your pond/gher	11	7	57	13	5	7	100
Source of information to maintain the quality of pond water	11	8	11	61	4	5	100

Source: Field Survey, 2019

According to table 4-19, majority of the participants (31%) collected information about hatching, quality feed and others using mobile. Rest of the participants collected the information from various sources such as, radio (21%), TV (15%), extension worker (14%), internet (17%), others (2%).

According to table 4-19, majority of the participants (29%) collected information about quality fingerling using mobile. Rest of the participants collected the information from various sources such as, radio (18%), TV (13%), extension worker (19%), internet (17%), others (4%).

According to table 4-19, majority of the participants (57%) collected information about using fertilizer in proper way in your pond through extension worker. Rest of the participants collected the information from various sources such as, mobile (13%), TV (7%), radio (11%), internet (5%), others (7%).

According to table 4-19, majority of the participants (61%) collected information to maintain the quality of pond water through extension worker. Rest of the participants collected the information from various sources such as, mobile (11%), radio (11%), TV (8%), internet (4%), others (5%).

4.5.1.2 Cultivation related to cattle

Table 4-20: Frequency table of rearing cattle

Indicators	Frequency	Percent
Yes	98	98.0
No	2	2.0
Total	100	100.0

Source: Field Survey, 2019

This table says that, 98% of the participants reared cattle while the rest (2%) were not engaged in rearing cattle.

Table 4-21: Frequency table of vaccinating cattle regularly

Indicators	Frequency	Percent
Yes	93	93.0
No	7	7.0
Total	100	100.0

Source: Field Survey, 2019

This table says that, 93% of the participants vaccinated their cattle regularly while the rest (7%) were not engaged in vaccinating their cattle.

Table 4-22: Frequency table of source of information regarding to cattle

Indicators	Radio	Television	Mobile	Extension Workers	Internet	Others	Total
Source of knowledge about vaccination	10	18	15	34	13	10	100
Source of information regarding health care of cattle	10	18	14	34	13	11	100

Source: Field Survey, 2019

According to table 4-22, majority of the participants (34%) collected knowledge about vaccination from extension worker. Rest of the participants collected the information from various sources such as, radio (10%), TV (18%), mobile (15%), internet (13%), others (10%).

According to table 4-22, majority of the participants (34%) collected knowledge regarding health care of cattle from extension worker. Rest of the participants collected the information from various sources such as, radio (10%), TV (18%), mobile (14%), internet (13%), others (11%).

4.5.1.3 Cultivation related to vegetables

All the respondents had replied in the affirmative that they cultivated vegetables.

Table 4-23: Frequency table of source information regarding cultivating vegetables

Indicators	Radio	Television	Mobile	Extension Workers	Internet	Others	Total
Media influence to grow vegetables	15	31	18	6	13	17	100
Source of knowledge about the market price of vegetables	17	18	27	6	20	12	100
Source of information related to pest management for vegetables	10	5	14	52	8	11	100

Source: Field Survey, 2019

According to table 4-23, majority of the participants (31%) were influenced more by TV in growing vegetables. Rest of the participants were influenced by radio (15%), extension worker (6%), mobile (18%), internet (13%), others (17%).

According to table 4-23, majority of the participants (27%) got information about market price of their vegetables from mobile. Rest of the participants got to know by radio (17%), extension worker (6%), TV (18%), internet (20%), others (12%).

According to table 4-23, majority of the participants (52%) got information related to pest management for their vegetables from extension worker. Rest of the participants got to know by radio (10%), mobile (14%), TV (5%), internet (8%), others (11%).

4.6 Problems and obstacles in using ICT

Table 4-24 says that, 85% of the participants knew the benefits of ICT while the rest (15%) were not aware of it. 83% of the participants replied in the affirmative that they had skills in using ICT while the rest (17%) replied in the negative regarding this. 67% of the participants answered that they did not have lack of time to use ICT while according to the rest the (33%) they did not have enough time to use ICT. 76% of the participants answered that they did not have difficulty in using ICT while according to the rest the (24%) they had difficulty in using ICT. 79% of the participants answered that they had no knowledge in using ICT while according to the rest the (21%) they had knowledge in using ICT. 83% of the participants replied in the affirmative that price

for ICT tools were expensive while according to the rest the (17%) the price was not that much expensive.

Table 4-24: Problems and obstacles in using ICT

Indicators	Yes (%)	No (%)	Total
Do not know the benefits of ICT?	85	15	100
Have no skills in using ICT?	83	17	100
Lack of time to use ICT	33	67	100
Difficulty in using ICT	24	76	100
Have no knowledge in using ICT	79	21	100
Price for ICT tools are expensive	83	17	100
Lack of ICT training	78	22	100
Language problem	76	24	100
Lack of technology infrastructure	80	20	100
No needs in using ICT	80	20	100
Not confidence in using ICT	79	21	100
Lack of support from the authorities	79	21	100
ICT is not user friendly	77	23	100
Lack of ICT support service	81	19	100
Believe that ICT is not safe	77	23	100
Lack of support staffs who have expertise in ICT	80	20	100
Lack of updated agriculture information in ICT	78	22	100
Unstable opportunity in accessing ICT	78	22	100
Lack of agriculture content in local ICT	78	22	100

Source: Field Survey, 2019

78% of the participants had lack of ICT training while the rest (22%) had ICT training. 76% of the participants had language problem while the rest (24%) had no problem in language. 80% of the participants had lack of technology infrastructure while the rest (20%) had enough technology infrastructure. 80% of the participants agreed that there was no need in using ICT while the rest (20%) did not agree with the statement. 79% of the participants agreed that they did not have confidence in using ICT while the rest (21%) did not agree with the statement. 79% of the participants agreed that they got lack of support from the authorities while the rest (21%) did not agree with the

statement. 77% of the participants agreed that ICT was not user friendly while the rest (23%) did not agree with the statement. 81% of the participants agreed that they got lack of ICT support service while the rest (19%) did not get lack of ICT support service. according to 77% of the participants ICT was not safe and 23% of the participants believed the opposite. 80% of the participants agreed that they got lack of support staffs who had expertise in ICT while the experience of the rest (20%) was opposite. 78% of the participants agreed that they got lack of updated agriculture information in ICT while the experience of the rest (22%) was opposite. 78% of the participants agreed that they got unstable opportunity in accessing ICT while the experience of the rest (22%) was opposite. 78% of the participants agreed that they got lack of agriculture content in local ICT while the experience of the rest (22%) was opposite.

4.7 Current status of membership

Table 4-25: Frequency table of current status of membership

Membership	Category	Frequency	Dercent
IPM	yes	55	55
	no	45	45
ICM	yes	52	52
	no	48	48
Common interest group	yes	83	83
	no	17	17
UP	yes	23	23
	no	77	77
UP Standing committee	yes	17	17
	no	83	83
Market management committee	yes	44	44
	no	56	56
Organized marketing group	yes	71	71
	no	29	29
Organized marketing group leader	yes	36	36
	no	64	64
Salish committee	yes	39	39
	no	61	61
School management committee	yes	23	23
	no	77	77
NGO group	yes	93	93
	no	7	7
NGO group leader	yes	22	22
	no	78	78
Corporative society member	yes	89	89
	no	11	11

Source: Field Survey, 2019

From table 4-25, it has become visualized that, participants' association with 'NGO group' as members took the highest place among all the institutions. In this case, 93% of the sample was found to be involved as members in this group. And 'UP Standing Committee' has found to be the institution with which participants were least frequently associated. 17% of the participants were the members of this group. Again, participants' involvement as 'NGO group leader' (22%), 'UP member' (23%), 'School management committee member' (23%), 'organized marketing group leader' (36%) , 'Salish committee member' (39%), 'Market management committee member' (44%) can be rated as lower than their involvement as 'ICM club member'(52%), 'IPM club member' (55%), 'organized marketing group member' (71%), 'Common interest group member' (83%), and 'corporative society member' (89%).

4.8 Status on direct access to technical assistance

Table 4-26: Frequency table of status of direct access to technical assistance

Direct access to technical assistance	valid	No. of farmers	percent
DAE (SAAO)	yes	81	81
	no	19	19
Agri. Inputs dealers	yes	80	80
	no	20	20
Private agri. Inputs company	yes	78	78
	no	22	22
NGO	yes	100	100
	no	0	0
BADC	yes	95	95
	no	5	5
Agri. project	yes	31	31
	no	69	69
University	yes	3	3
	no	97	97
Innovative farmers	yes	81	81
	no	19	19
Media	yes	21	21
	no	79	79

Source: Field Survey, 2019

From table 4-26, it was observed that, all the participants had direct access to technical assistance from NGO. Also, the largest part of the sample (95%) was receiving technical assistance directly from BADC. DAE (SAAO) (81%), Innovative farmers (81%), Agri. Input dealers (80%), Private agri. input company (78%) were also found to make a great contribution to the participants' having direct access to technical assistance while the contributions of 'Agri. Project' (31%), 'Media' (21%), 'University' (3%) were found relatively negligible.

4.9 Effect of ICT Advancements

4.9.1 District wise association with ICT for different purposes

4.9.1.1 Market price knowledge purpose

According to table 4-27, in Barishal district participants were more often using mobile phones and internet (41.17%) to know the market price of vegetables than other ICT sources such as radio (11.76%) and extension worker (5.88%). In fact, in this district no participant was using TV or other ICT sources. Also, the use of internet was found to be higher in this district than any other district.

In Patuakhali district, participants were found to use radio more extensively (47.06 %) than TV (23.53 %), mobile (17.65 %), internet (11.76 %) and no participant was found to use extension worker and others. Also, in this district radio users existed at the highest percentage (47.06%) than any other district to know the market price of vegetables.

Table 4-27 also indicates that, in Bhola participants were using ICT sources (43.75%) to know the market price of vegetables other than radio (12.5%), mobile (18.75%), extension worker (12.5%), internet (12.5%) more significantly than any other district. And to know the market price of vegetables, no participant was using TV in this district.

Table 4-27: Association between district and the ICT sources of knowing the market price of vegetables.

District	Knowing the market price of vegetables						Total
	Radio	TV	Mobile	Extension worker	Internet	Others	
Barishal	2	0	7	1	7	0	17
Patuakhali	8	4	3	0	2	0	17
Bhola	2	0	3	2	2	7	16
Borguna	2	2	8	1	0	3	16
Jhalokathi	3	7	0	2	5	0	17
Pirojpur	0	5	6	0	4	2	17
Total	17	18	27	6	20	12	100

In Borguna district, the use of mobile phone to know the market price of vegetables occupied the highest place (50%) among the participants than any other district. The use of radio (12.5%), TV (12.5%), extension worker (6.25%) and other (18.75%) was found relatively less significant than mobile phone. Surprisingly although mobile users were higher in this district, no participant was found to use internet to know the market price of vegetables.

In Jhalokathi district, it was found that most of the participants (41.18%) were using TV, which is also the highest percentage among all other district and internet (29.41%) than radio (17.65%) and extension worker (11.76%). Also, no participant was found to use mobile or other sources of ICT in this district to know the market price of vegetables.

In Pirojpur district, participants were more often using mobile (35.29%), TV (29.41%) and internet (23.53%) to know the market price of vegetables. Few participants (11.76%) were using other ICT sources and no participant was using extension worker. Overall, it can be said that most of the participants were using mobile (27%) and internet (20%) than radio (17%) and TV (18%). And extension worker (6%) and other sources of ICT (12%) were less frequently used to know the market price of vegetables.

H_0 = there is no association between district and source of market price information

Table 4-28: Chi-square test for district and source of market price information

Indicator	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	68.939	25	.000
N	100		

According to table 4-28, chi-square test for independence with 1% level of significance was used to access whether the district had association with source of market information. Here, the chi-square test was statistically significant.

4.9.1.2 Information related to pest management for vegetables purpose

From table 4-29, it can be said that in Barishal district most of the participants (29.41%) were using mobile, extension worker and internet to get the information related to pest management for vegetables. Very few participants (11.76%) were using radio and no participant was using TV and other sources of ICT.

It can also be depicted from table 4-29 that, in Patuakhali district highest number of participants (47.06%) were using radio which was also the highest radio using percentage among all the districts. The percentages of users of mobile (17.67%), TV (11.76%), extension worker (11.76%), internet (11.76%) to get the information related to pest management for vegetables were relatively small while no participant was using other sources of ICT to get the information related to pest management for vegetables.

Table 4-29 shows that, it was Bhola in which participants (56.25%) were extensively using extension worker to get the information related to pest management for vegetables. Use of other sources of ICT by the participants (31.25%) was also not negligible in this district. Very few participants were using TV (6.25%) and mobile (6.25%). But radio and internet were not used by any participant in district to get the information related to pest management for vegetables.

Table 4-29: Association between district and the ICT sources of getting the information related to pest management for vegetables.

District	Getting information related to pest management for vegetables						Total
	Radio	TV	Mobile	Extension worker	Internet	Others	
Barishal	2	0	5	5	5	0	17
Patuakhali	8	2	3	2	2	0	17
Bhola	0	1	1	9	0	5	16
Borguna	0	1	2	9	0	4	16
Jhalokathi	0	0	0	16	1	0	17
Pirojpur	0	1	3	11	0	2	17
Total	10	5	14	52	8	11	100

Source: Field Survey, 2019

Similar to Bhola, in Borguna district no participant was using radio & internet and 56.25% of the participants were using extension worker to get the information related to pest management for vegetables. Few participants (25%) were using other sources of ICT and the percentages of the users of TV (6.25%) and mobile (12.5%) to get the information related to pest management for vegetables were found to be negligible.

In Jalkathhi district almost all the participants (94.12%) were using extension worker to get the information related to pest management for vegetables. This was also the highest percentage of users of extension worker among all the districts. Here the percentage of the user of internet (5.88%) was negligible while no participant was found to use radio, TV, mobile and other sources of ICT to get the information related to pest management for vegetables.

In Pirojpur, similar to the Jhalkathhi, most of the participants (64.71%) were using extension worker as source of getting the information related to pest management for vegetables. Only 17.67% of the participants in this group was using mobile while the percentages of the users of TV (5.88%) and other sources of ICT (11.76%) were also very low to get the information related to pest management for vegetables. Also, in this district no participant was using radio and internet.

From an overall viewpoint it can be depicted from the table 4-29 that, in total most of the participants (52%) were using extension worker as a source of getting the information related to pest management for vegetables. The percentages of the users of radio, TV, mobile, internet and others were 10%, 5%, 14%, 8%,11% respectively.

H_0 = there in no association between District and sources of getting the information related to pest management for vegetables

Table 4-30: Chi-square test for district and sources of getting the information related to pest management for vegetables

Indicator	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	81.574	25	.000
N	100		

According to table 4-30, chi-square test for independence with 1% level of significance was used to access whether the district had association with sources of getting the information related to pest management for vegetables. Here, the chi-square test was statistically significant.

4.9.2 Crosstabulation of total annual income and use of ICT

From table 4-6 we know that 5%, 69%, 17% and 9% farmers had annual income of 0 to 50000 TK, 50000 to 100000 TK, 100000 to 150000 TK and 150000 to above TK respectively. Now, in table 4-31 we can depict that 69% farmers who had annual income of 50000 to 100000, had a majority portion of 46% farmer who used ICT. On the contrary, 17% farmers who had annual income of 100000 to 150000, had a majority portion of 13% farmers who used ICT. Also, 5% farmers of 0 to 50000 TK and 9% farmers of 150000 to above TK had a majority portion of 3% and 7% farmers respectively who had used ICT.

Table 4-31: Crosstabulation of total annual income and use of ICT

Total Annual Income range in Tk.	Using ICT		Total
	Yes	No	
0-50000	3	2	5
50000-100000	46	23	69
100000-150000	13	4	17
150000 and above	7	2	9
Total	69	31	100

H_0 = there is no association between income group and using ICT of farmers

Table 4-32: Chi-square test for total annual income and use of ICT

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1.133 ^a	3	.769
Likelihood Ratio	1.166	3	.761
N of Valid Cases	100		
a. 3 cells (37.5%) have expected count less than 5. The minimum expected count is 1.55.			

According to table 4-32, chi-square test for independence was used to assess whether the income group had association with using ICT of farmers. Here, the chi-square test was statistically insignificant.

4.9.3 Crosstabulation of total annual income and education level of farmers

According to table 4-33, majority of 3% farmers out of 5% farmers who had an educational level of JSC, had an annual income of 0 to 50000 TK. Majority of 28% farmers out of 69% farmers who had an educational level of JSC, had an annual income of 50000 to 100000 TK. Majority of 8% farmers out of 17% farmers who had an educational level of JSC, had an annual income of 100000 to 150000 TK. Also, majority of 3% farmers out of 9% farmers who had an educational level of JSC, had an annual income of 0 to 50000 TK.

Table 4-33: Crosstabulation of total annual income and education level of farmers

Total Annual Income in Tk	Educational Level of Farmers						Total
	Illiterate	PEC	JSC	SSC	HSC	Graduate & above	
0-50000	1	0	3	1	0	0	5
50000-100000	1	14	28	14	6	6	69
100000-150000	0	2	8	4	2	1	17
150000 and above	0	2	3	1	1	2	9
Total	2	18	42	20	9	9	100

H_0 = There is no association between total annual income and education level of farmers

Table 4-34: Chi-square test for total annual income and education level of farmers

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	16.14 ^a	15	.37
Likelihood Ratio	10.49	15	.78
Linear-by-Linear Association	1.59	1	.20
N of Valid Cases	100		
a. 18 cells (75.0%) have expected count less than 5. The minimum expected count is .08.			

According to table 4-34, chi-square test for independence was used to assess whether the annual income had association with education level of farmers. Here, the chi-square test was statistically insignificant.

4.9.4 Crosstabulation of Age Distribution of Farmers and Educational Level of Farmers

According to table 4-35, 19% farmers out of 42% who had educational level of JSC, were in 40-50 years old. 9% farmers out of 20% who had educational level of SSC, were in 40-50 years old. 8% farmers out of 18% who had educational level of PEC, were in 40-50 years old. 5% farmers out of 9% who had educational level of Graduation, were in 30-40 years old.

Table 4-35: Crosstabulation of age distribution of farmers and educational level of farmers

Age Distribution of Farmers	Educational Level of Farmers						Total
	Illiterate	PEC	JSC	SSC	HSC	Graduate & above	
20-30	0	0	0	1	2	4	7
30-40	1	0	8	6	3	5	23
40-50	0	8	19	9	2	0	38
50-60	0	6	15	3	2	0	26
60-70	1	4	0	1	0	0	6
Total	2	18	42	20	9	9	100

H_0 = There is no association between age distribution of farmers and educational level of farmers

Table 4-36: Chi-square test for age distribution of farmers and educational level of farmers

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	64.35 ^a	20	.000
Likelihood Ratio	64.12	20	.000
Linear-by-Linear Association	31.48	1	.000
N of Valid Cases	100		

a. 24 cells (80.0%) have expected count less than 5. The minimum expected count is .12.

According to table 4-36, chi-square test for independence was used to assess whether age distribution of farmers had association with education level of farmers. Here, the chi-square test was statistically significant.

4.9.5 Crosstabulation of District and Education Level of Farmers

According to table 4-37, most of the respondents of 42% have their education up to class 8 or equivalent to JSC. In Barishal district, majority of 8% respondents out of 17% completed their SSC. In Patuakhali, majority of 6% respondents out of 17% completed their JSC. In Bhola and Borguna, majority of 9% respondents out of 16% completed

their JSC. In Jhalokathi, 5% respondent have done PEC, 5% respondent had done graduation and 4% respondent had done SSC out of 17% respondents. In Pirojpur district, majority of 10% respondents out of 17% completed their SSC.

Table 4-37: Crosstabulation of district and education level of farmers

District	Education Level of Farmers						Total
	Illiterate	PEC	JSC	SSC	HSC	Graduate & above	
Barishal	1	0	6	8	2	0	17
Patuakhali	1	5	6	2	3	0	17
Bhola	0	3	9	3	0	1	16
Borguna	0	1	9	2	2	2	16
Jhalokathi	0	5	2	4	1	5	17
Pirojpur	0	4	10	1	1	1	17
Total	2	18	42	20	9	9	100

H_0 = there is no association between district and education level of farmers

Table 4-38: Chi-square test for district and education level of farmers

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	42.33 ^a	25	.017
Likelihood Ratio	47.30	25	.005
N of Valid Cases	100		

a. 30 cells (83.3%) have expected count less than 5. The minimum expected count is .32.

According to table 4-38, chi-square test for independence was used to assess whether district had related with education level of farmers. Here, the chi-square test was statistically significant.

4.9.6 Crosstabulation of District and use of ICT

According to table 4-39, 69% respondents use ICT whereas, in Barishal, 15% respondent out of 17% used ICT. In Patuakhali, 12% respondent out of 5% used ICT.

At the same time, we can see that respondent of Bhola had equal percentage of user of ICT and non-user of ICT. In Borguna, 11% respondent out of 16% used ICT. In Jhalokathi, 11% respondent out of 17% used ICT. In Pirojpur, 12% respondent out of 17% used ICT. Table 4-39 shows that except the respondents of Bhola, respondents of Barishal, Patuakhali, Borguna, Jhalokathi and Pirojpur had more ICT advancement.

Table 4-39: Crosstabulation of District and use of ICT

District	Using of ICT		Total
	Yes	No	
Barishal	15	2	17
Patuakhali	12	5	17
Bhola	8	8	16
Borguna	11	5	16
Jhalokathi	11	6	17
Pirojpur	12	5	17
Total	69	31	100

H_0 = there in no association between district and use of ICT

Table 4-40: Chi-square test for district and use of ICT

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	5.82 ^a	5	.323
Likelihood Ratio	6.18	5	.289
N of Valid Cases	100		
a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 4.96.			

According to table 4-40, chi-square test for independence was used to access whether district had related with use of ICT. Here, the chi-square test was statistically insignificant.

4.9.7 Crosstabulation of District and total annual income

According to table 4-41, majority of 69% of respondents had annual income of 50000 TK to 100000 TK. In Barishal and Patuakhali, 12% respondents out of 17% respondents

earned 50000 TK to 100000 TK. In Bhola, 9%, 4% and 3% respondents had earned 50000-100000 TK, 100000-150000 TK and above 150000 TK respectively. In Borguna, 14% and 2% respondents had earned 50000-100000 TK and 100000-150000 TK respectively. In Jhalokathi, 1%, 15% and 1% respondents had earned 0-50000 TK, 50000-100000 TK and 100000-150000 TK respectively. In Pirojpur, 7%, 7% and 3% respondents had earned 50000-100000 TK, 100000-150000 TK and above 150000 TK respectively.

Table 4-41: Crosstabulation of District and total annual income

District	Total Annual Income in Tk.				Total
	0-50000	50000-100000	100000-150000	150000 and above	
Barishal	3	12	0	2	17
Patuakhali	1	12	3	1	17
Bhola	0	9	4	3	16
Borguna	0	14	2	0	16
Jhalokathi	1	15	1	0	17
Pirojpur	0	7	7	3	17
Total	5	69	17	9	100

H_0 = there is no association between district and total annual income

Table 4-42: Chi-square test for district and total annual income

Indicators	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	29.11 ^a	15	.016
Likelihood Ratio	33.43	15	.004
N of Valid Cases	100		

a. 18 cells (75.0%) have expected count less than 5. The minimum expected count is .80.

According to table 4-42, chi-square test for independence was used to access whether district had related with total annual income. Here, the chi-square test was statistically significant.

4.9.8 T-test between Household total annual income in Agriculture after using ICT and Household total annual income in Agriculture before using ICT

Let, the null hypothesis for the Household total annual income in Agriculture after using ICT and Household total annual income in Agriculture before using ICT

$$H_0: \mu_x = \mu_y$$

Here,

μ_x = Population means of household total annual income in agriculture before using ICT

μ_y = Population means of household total annual income in agriculture after using ICT

Table 4-43: Paired difference between Household total annual income in Agriculture after using ICT and Household total annual income in Agriculture before using ICT

Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
6890.00	6639.18	663.92	5572.64	8207.36	10.38	99.00	0.00

According to table 4-43, the mean difference between Household total annual income in Agriculture after using ICT and Household total annual income in Agriculture before using ICT was 6890 TK, standard deviation was 6639.18, standard error of mean of total annual income was 663.92 TK, which revealed that the Paired difference between Household total annual income in Agriculture after using ICT and Household total annual income in Agriculture before using ICT was significant at 1% level. So, the study rejected the null hypothesis (H_0) that means there is a significant difference between household total annual income in agriculture before using ICT and household total annual income in agriculture after using ICT of the sample respondents.

4.9.9 T-test between Total Annual Income in Tk and Total Annual Expenditure in Tk.

Let, the null hypothesis for the total Annual Income in Tk and total Annual Expenditure in TK of the farmers.

$$H_0: \mu_1 = \mu_2$$

Here,

μ_1 = Population mean of total annual Income in Tk

μ_2 = Population mean of total annual Expenditure in Tk.

Table 4-44: Paired difference between Total Annual Income in Tk and Total Annual Expenditure in Tk.

Paired Differences					t	df	Sig. (2-tailed)
Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
			Lower	Upper			
28186.00	28818.13	2881.81	22467.86	33904.14	9.78	99	0.00

According to table 4-44, the mean difference between total annual income in TK and total annual expenditure in Tk. was 28186TK, standard deviation was 28818.13, standard error of mean of total annual income was 2881.81 TK, which revealed that the Paired difference between total annual income in tk and total annual expenditure was significant at 1% level. So, the study rejected the null hypothesis (H_0) that mean there is a significant difference between total annual income and total annual expenditure of the sample respondents.

4.9.10 Regression analysis for farmers' total annual expenditure with respect to age, total annual income and education status

The Table 4-45 represented that the regression equation explains about 43% of the variability in dependent variable of total annual expenditure. It was an acceptable level of R Square in explaining variability of farmers' total annual expenditure. The results of the multiple regression models indicate that age, total annual income and educational status explained the variance in overall total annual expenditure. The value of the R

Square was an acceptable value for explaining variability of farmers' total annual expenditure.

Table 4-45: Regression analysis for farmers' total annual expenditure with respect to age, total annual income and education status

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.65 ^a	.430	.41	22564.65
a. Predictors (Constant): Age, Total Annual Income in Tk., Education Status				
b. Dependent Variable: Total Annual Expenditure in Tk.				

Analysis of variance (ANOVA) in table 4-46 indicated that the model was highly significant at 1% level of significance. This table provided the information on the significance of the model indicating a significant p-value of .000 and F= 24.134. This indicated that the overall model was reasonably fit and there was a statistically significant association between different predictors and overall, of farmers' total annual expenditure. The ANOVA findings are shown in Table 4-46.

Table 4-46: ANOVA table of total annual expenditure with respect to age, total annual income and education status

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36865059973.93	3	12288353324.64	24.13	.00 ^b
	Residual	48879718426.06	96	509163733.60		
	Total	85744778400.00	99			
a. Dependent Variable: Total Annual Expenditure in Tk.						
b. Predictors: (Constant), Age, Total Annual Income in Tk., Education Status						

Table 4-47 represents that the values of the t-statistic(s) are significant for annual income. Thus, the predictor variable could be remained constant in the model. In other hand, these variables could explain the change in overall farmers' total annual expenditure. Table 4-48 revealed that one independent variable was found to be

significant of regression analysis except age and Education Status were not statistically significant.

Table 4-47: Coefficient of total annual expenditure with respect to age, total annual income, education status

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	29968.44	16492.05		1.81	.07
	Total Annual Income in Tk.	.53	.06	.67	8.05	.00
	Education Status	-321.46	832.14	-.03	-.38	.70
	Age	-213.16	284.12	-.07	-.75	.45
a. Dependent Variable: Total Annual Expenditure in Tk.						

4.9.11 Regression analysis for farmers' Total Annual Income with respect to Age, Education Status

The Table 4-48 represented that the regression equation explained about 16% of the variability in dependent variable of total annual income. It was poor value of R Square in explaining variability of farmers' total annual income. The results of the multiple regression models indicated that age, and educational status explained the variance in overall farmers' total annual income.

Table 4-48: Regression analysis for total annual income with respect to age, education status

Model Summary^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.398 ^a	.159	.14	34744.89	1.07
a. Predictors (Constant): Age, Education Status					
b. Dependent Variable: Total Annual Income in Tk.					

Analysis of variance (ANOVA) in table 4-49 indicated that the model was highly significant at 1% level of significance. This table provided the information on the significance of the model indicating a significant p-value of .000 and F= 9.142. This indicated that the overall model was reasonably fit and there was a statistically significant association between different predictors and overall, of farmers' total annual Income. The ANOVA findings was shown in Table 4-49.

Table 4-49: ANOVA table for total annual income with respect to age, education status

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22071432440.86	2	11035716220.43	9.14	.00 ^b
	Residual	117099157559.13	97	1207207809.88		
	Total	139170590000.00	99			
a. Dependent Variable: Total Annual Income in Tk.						
b. Predictors: (Constant), Age, Education Status						

Table 4-50 represented that the values of the t-statistic(s) of independent variables were significant for annual income. Thus, the predictor variable could be remained constant in the model. In other hand, these variables could explain the change in overall farmers' total annual income. Table 4-50 revealed that one independent variable was found to be significant of regression analysis.

Table 4-50: Coefficient of Total Annual Income with respect to Age, Education Status

Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10128.54	25373.51		-.39	.691
	Education Status	4012.27	1214.84	.34	3.30	.001
	Age	1601.29	406.15	.41	3.94	.000

a. Dependent Variable: Total Annual Income in Tk.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

5.1.1 Introduction

The main occupation of the people of Bangladesh is agriculture and the largest segment of her national economy comes from this sector. So, the need for developing agriculture is a burning question of the time to mitigate food problem. Now-a-days agricultural information is considered by the farmers as an important input of agricultural production like other inputs. From past researches it was found that the low of agricultural information among the farmers of our country is inadequate and slow. The consequential reasons for poor communication media use in receiving agricultural information on selected agricultural technologies and agriculture production practices resulting poor yield in both the cases. Moreover, the farmers have not been properly trying the modern technologies like improved agricultural practices, although they constitute the majority of the total farming population of the country. This is a major cause of poverty, low production, and backwardness and years- long food shortage of the people of Bangladesh. The use of modern technologies along with receiving agricultural information regarding improved cultivation practices, though proven to be remunerative, has not yet been in large scale acceptance by most of the farmers. But it will be of no use unless the ideas reach them. Therefore, in bringing about technological changes among the farmers, it is essential to improve impact of information and communication technologies regarding agricultural information. Considering the national importance and economic contribution made by the farmers, the present piece of research work was designed. The **present study was undertaken in Barishal division**, keeping the following specific objectives in view:

- i. To determine and describe some selected characteristics of the Farmers.
- ii. To determine the impacts of ICTs tools and advancement
- iii. To statistically describe the way of selling crops, community membership and technical assistance
- iv. To find out actual problems and obstacle of using ICT
- v. To explore the influence between information and communication technology (ICT) and farmer's income, age and educational level.

5.1.2 Methodology

The respondents of this study were 100 farmers, who cultivated crops, vegetable and rear cattle in six upazilas in six districts of barishal division. However, data for this study were collected from a sample of 100 farmers selected by random sampling technique. The researcher personally collected data for this study by using an interview schedule in Bengali. Simple, easy and direct questions were included in the interview schedule. The data were collected from November 3, 2019 to December 10, 2019. Impact of information and communication technologies use by the farmers was the dependent variable of this study. Fourteen characteristics of farmers were selected as independent variables. These characteristics were age, education, farm size, farmer's accommodational level, annual income, annual expenditure, source of market information, farmers' networking, cultivation information, use of ICT, farming experience, access to technical assistance, community membership, and agricultural knowledge. The farmers were classified into suitable categories in respect of ICTs use by them in receiving agricultural information. In developing the categories, the investigator was guided by the nature of the data and standard criteria were taken into consideration of the existing social system. The statistical measures such as number, percentage distribution and mean were used in describing the findings related to information and communication technologies used by the farmers in receiving agricultural information. Correlation analysis was used as the principal statistical method for analyzing the data. All these analyses were done by a computer using the SPSS (Statistical Package for Social Science). The level of probability fixed for the rejection of a null hypothesis was 0.05.

5.1.3 Summary of findings

5.1.3.1 Characteristics profile of the farmers

the ages of the farmers ranged from 20 to 70 years. Major 37% of the participants was from 40-50 age. Most of the participants (42%) was JSC or class 8 pass. Majority of 28% farmers out of 69% farmers who had educational level of JSC, had annual income of 50000 to 100000 TK. All respondents had land for crop cultivation. On the average the participants had 60.64 decimal lands. 99% of the participants had organized homestead garden. The majority (71%) among the participants were living in 'semi-pacca' house. Respondents of 69% were able to have annual income of 50000 to 100000 TK. Household total average annual income in Agriculture after using ICT was 45970 TK whereas before using ICT, annual income was 39080 TK. 69% farmers who had

annual income of 50000 to 100000, had a majority portion of 46% farmer who used ICT. Household total expenditure in agriculture was less than household total income in agriculture both before and after using ICT. Household total expenditure in Agriculture was 15644 TK. Household total expenditure in Others was 53460 TK. Average difference between total Annual Income in Tk and total Annual Expenditure in Tk was 28186 TK. Majority of the farmers had mobile, radio and tv. Majority 69% farmers' annual income is between 50000 to 100000 TK.

5.1.3.2 Statistics on selling crops

Majority of 95% of the participants were engaged in selling surplus crops. Majority of the participants (64%) used to accomplish marketing agricultural products through self-marketing. All the respondents were engaged in selling crops in field, local market and wholesale market. Majority of 80% farmers had been in association of organized group.

5.1.3.3 Networking through ICT

Networking among entrepreneurs and customers were conducted widely using mobile (95%). Networking among suppliers was conducted widely using mobile (91%). Networking among development agency through ICT and electronic media was conducted widely using extension worker (29%).

5.1.3.4 Statistics on ICT tools and their advancements

69% of the participants watched television regularly. Most of the participants (53%) watch news programs on T.V. most of the participants (73%) reported that they used mobile phones for family communication. Majority of farmers had claimed that they get information related to weather forecast, market information, production input and loan services through mobile.

5.1.3.5 ICT and cultivation

Majority of farmers had claimed that they get information related to fisheries through mobile. A number of farmers had affirmative about the information related to cattle through mobile, radio, internet and television. Majority of farmers had information regarding vegetable through radio, TV, mobile and internet.

5.1.3.6 Problems and obstacles regarding ICT

Majority of farmers knew the benefits of ICT but they also claimed difficulty, expensive, no confidence, lack of support, lack of training, lack of user friendly etc regarding ICT.

5.1.3.7 Current status on membership and technical assistance

Farmers' association with 'NGO group' as members took the highest place among all the institutions in the category of membership status and getting technical assistance.

5.1.3.8 Effects of ICT on dependent variables

The chi-square test to access whether the district had association with source of market information and whether the district had association with sources of getting the information related to pest management for vegetables was statistically significant. The chi-square test for independence was used to access whether age distribution of farmers had association with education level of farmers was statistically significant. Also, the chi-square test for independence was used to access whether district had related with education level of farmers was statistically significant. Chi-square test was used to access whether district had related with total annual income was statistically significant.

There is a significant difference in T-test between household total annual income in agriculture before using ICT and household total annual income in agriculture after using ICT of the sample respondents and a significant difference between total annual income and total annual expenditure of the sample respondents. The regression equation explains about 43% of the variability in dependent variable of total annual expenditure and about 16% of the variability in dependent variable of total annual income. The values of the t-statistic(s) are significant for annual income.

5.2 Recommendations

5.2.1 Recommendations for policy implications

On the basis of the findings and conclusion of the study, the following recommendations for policy implication are made:

1. Considering the overall situation, it was recommended that care should be taken by the GOs, NGOs, DAE and other development agencies in properly handling communication media with the farmers and disseminate ICT materials to farmers. It should be remembered that failure of one effort may lead to reduce credibility of a particular communication medium which may take long time to overcome associated psychological barriers for proper use of ICTs. Further, development in human societies results from their continuous improvement where agricultural and other socio-economic information available to them play a very important role.

2. The study reveals that the farmers having better education could improve the existing status of using communication media. As forty eight percent of the farmers in the study

area had no education to primary level of education, non-formal education facilities (i.e. mass education program) should be extended to them by Extension Agents of both GOs and NGOs.

3. It was revealed that the farmers with better social participation could expose themselves more within his locality and also with various information sources and communication technologies. Therefore, group approach of extension could effectively be used by different extension agencies as well as communication media in disseminating information. Different motivational programs by the concerned organizations could encourage them further in the use of more communication media to address their problems.

4. Agricultural knowledge showed a positive and significant relationship with their use of ICTs. It is recommended to arrange adequate training programs for the farmers and other instructional methods to increase their agricultural knowledge.

In this modern digitalized world, everyone is sharing his innovation. Plenty of information are available in internet. Being a globalized industry and activity, farming involves translocal practices expressed in farmer and labor mobility, information exchange and economic and political interdependencies. Cosmopolitanism as an idea and in relation to practices contributes to understanding of what characterizes transnational practices and what they are intended to achieve. Through cosmopolitanism, an individual consequently become motivated to adopt the take media information and use modern technologies due to influence by others. The findings of the study lead to the conclusion that for become successful farmer, they need to be cosmopolite for their awareness of ICTs use.

5.2.2 Recommendations for future study

Short term and sporadic study being conducted in some specific location cannot provide all information for proper understanding about different activities and related matters. Future studies should be undertaken covering more dimensions in the related matters. The following recommendations are suggested in this connection:

1. It is strongly felt that study of this nature be replicated in other parts of Bangladesh. This recommendation is made because the study area at six upazilas of six districts of Barishal division in Bangladesh is not typical of the situation in the entire country.

2. This study investigated the effects of eleven characteristics of the farmers on their impact of information and communication technologies use. Therefore, it is recommended that further study should be conducted involving other characteristics (farm facilities, social status, marketing facilities etc.) in this regard to better interpret the unexplained variations.
3. Similar study should also be replicated in future for studying any change of pattern regarding impact of ICTs use among the same population of the present study area to arrive at generalizations for policy implications.
4. On the basis of the characteristics pattern of farming population, more researches should be conducted to investigate the comparative impact of ICTs use with other extension method and also identify the factors influencing impact of ICTs use, its utilization as well as impact of receiving information by the farmers.
5. In this study, only the survey method (quantitative tool) was used for collection of data. It is recommended to conduct further research using some other qualitative tools (e.g. Focus group discussion (FGD), case study, problem free analysis etc.) in order to achieve more accuracy of information.

BIBLIOGRAPHY

- Ahmed, H. 1977. Use of Information Sources by the Farmers in the Adoption of Improved Farm Practices in Jute cultivation. Unpublished M.Sc. (Ext. Ed.) Thesis. Bangladesh Agricultural University, Mymensingh.
- Ailin-Ton, J. 1991. Addressing the information needs of farmers and the extension services: the Malaysia Experiment Quarterly Bulletin of IAALD. 36 (1-2): Pp 36-39.
- Anisuzzaman, M. 2003. Use of Communication Media by the farmers in the Adoption of Improved Rice Production Technology. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- BBS. 2004. Statistical Year Book of Bangladesh. Bangladesh Bureau of Statistics, Statistical division, M
- Beal, G.M. and D.N. Sibley. 1967. Adoption of Agricultural Technology by the Indians of Guatemala, A Summary, Rural Sociology Report 62, Iowa state University, Ames, Iowa.
- Bhuiyan, M.S.I. 1988. Use of Communication Media by The Farmers in the Adoption of Selected Improved Farm Practices in Rice cultivation. M.Sc. (Ext. Ed.) Thesis. Department of Agricultural Extension and Teacher's Training, Bangladesh Agricultural University, Mymensingh.
- CGIAR. 1995. Renewal of the CGIAR: sustainable agriculture for food security in developing country. Ministerial-level Meeting, Lucerne, Switzerland, February 9-10, 1995. CGIAR, Washington, D.C. USA. Pp 133.
- Chanhan, K.N.K. and B.P. Sinha. 1979. Effectiveness of TV and its Combination in Transferring Technologies Know-how to Farmers. Indian Journal of Extension Education. 15 (1&2): Pp 9-18.
- Cherihan, A. and A. Chandra. 1989. Impact of TV on Acquisition and Retention of Knowledge by Rural People. Indian Journal of Extension Education. 25 (3 & 4): Pp 28-32.
- Diaz-Knauf, K., C. Ivankovich, F. Aguilar, C. Bruhn and H. Schulz. 1993. Consumer Attitude Towards Food Safety to Production in Costa Rica. Journal of Food Service System. 7(2): Pp 105-115.
- Fomo, D.A. 1999. Sustainable development starts with agriculture. In: Sustainable solutions: the action report of the sustainable agriculture initiative. Novello Press Ltd., London. UK. Pp 8-11.
- Goode, W.J. and P.K. Halt. 1952. Methods of Social Research. New York: McGraw-Hill Book Company, Inc.

- Halim, A. 1982. Schooling, Extension and Agricultural production. *Bangladesh Journal of Agriculture*, 6(4); Pp.7(1).
- Hooda. R.S. 1989. Study of Communication Behaviour of Farmers in Hisar District with Special Emphasis of Associated Constraints, *Thesis Abstract*, vol. xv, No. 4, December 1989, Directorate of Publications, Haryana Agricultural University, Hisar, India, Pp. 215.
- Hossain, M.A. 1971. Adoption of Improved Farm Practices by the Transplanted Aman Growers in Gouripure Union of Mymensingh District. (M.Sc. Ext. Ed.) Thesis, BAU. Mymensingh.
- Hossain, M.D. 1981. Relationship of Selected characteristics of the Jute growers with their adoption of improved practices of Jute cultivation. M.Sc. (Ext. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- Hossain, S.M.A. and B.R. Crouch. 1992. Patterns and Determinants of Adoption of Farm Pra
- HRDP. 2002. Training manual winter vegetable and Spices Production. FAO/UNDP/ASDB Project BGD/87/025, Dhaka. Department of Agricultural Extension and Bangladesh Agricultural Development Corporation, Dhaka. Pp. 43-47.
- Huque, M.M. 1982. Masagana 99 Farmers' Perception of the Effectiveness of Communication Media and their use in Bay. Laguna. M.S. Thesis. University of the Philippines at Los Banos.
- Josi, N. N. and S.N. Laharia. 1990. Content Analysis of Krishi Darshan Program. *Indian Journal of Extension Education*. 21 (1&2): 22-31.
- Kabir, M.K. and M.K. Bhattachargee. (1994). Impact of Radio and Television on Rural People. Bangladesh Academy of Rural Development. Comilla.
- Kaini, B.R. 2007. Roles of Information and Communication Technologies (ICTs) to Alleviate Poverty through Agricultural Development: ICT Initiatives in Agricultural Research and Extension System. *ICT for Agricultural Research and Development*. Pp 67-77.
- Karim, A.M.A. 2005. Information Media Used by the cotton Farmers in Producing cotton in a Ten-country Area of North central Texas. M.S. Thesis, Texas A & M University.
- Kashem, M.A. and E. Jones. 1988. Small Farmers Contact with Information Sources and its Relationship with Some Selected Characteristics, *Bangladesh Journal of Extension Education*, 3(1): Pp 1 -7.
- Kashem, M.A. and A. Halim. 1991. Use of Communication Media in the Transfer of Technologies to Farmers: A Farm Level Study. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh and Bangladesh Agricultural Research Council, Dhaka.

- Khalil, M.I. 1998. Information Sources Used by Farmers in Producing HYV Rice. M.S. (Ag. Ext. Ed) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agriculture (IPSA), Salna, Gazipur
- Khan, M.M. R. 1996. Use of Information sources by the Resource-poor Farmers in Receiving Information related to Cultivation of Selected Winter Vegetable M.Sc. (Ext. Ed.) Thesis. Bangladesh Agricultural University, Mymensingh.
- Knox, J.W. 1962. Relative Value of Mass Media in Extension (4ba). Master Report (M. Ed. in Ext. Ed.). Colorado State University.
- Laharia, S.N. and N.N. Joshi (1992). Farm Telecast Viewing Behaviour of Farmers. Indian Journal of Extension Education. 28 (1&2): Pp 15-22.
- Latif, M.A. 1974. How Farmers Receive Agricultural Information. M. Sc. (Ex. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- O' Farrell, C. 2003. Global Trends and Major Issues of ICT Application in Agriculture. Paper presented at APO seminar on Information And Communication Technology (ICT) for Improved Agricultural Productivity and competitiveness, held in Yogyakarta, Indonesia during 8-12 September 2003.
- Orojobi, J.O. 1980. Source of Agricultural Information and Advice Available to Nigerian Farmers: Advantage and Limitation. Ahmadu Bello University. Zaria, Nigeria.
- Pandian, S. 2002. Impact of Video Education on Knowledge Retention. Indian Journal of Extension Education. 38 (3&4): Pp 153-157.
- Papa, A.G. 1991. Intensity of Extension Contact and Innovativeness of Multiple Cropping Farmers in four Upland Town of Cavite. Philippines Collage. Laguna. The Philippines.
- Parvez, M.A.Q. 1977. Farmers Exposure to Agricultural Radio Programme and its Related Aspects. An M.Sc. Thesis. Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Rahman, M.M. 1974. An Investigation into the Use of Communication Sources by the Registered jute Seed Growers of Meherpur Thana. M. Sc. (Ex. Ed.) Thesis, Bangladesh Agricultural University, Mymensingh.
- Rahman, M.M. 1996. Factors Affecting the Communication Behaviour of Winter Vegetable Growers of Sherpur Thana under Bogra District. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agriculture (IPSA), Salna, Gazipur.
- Reddy, G.Y. 1982. Role of communication in rural Development for Eradication of Rural Poverty. Indian Journal of Regional Science. 14 (2):109-119.
- Rogers, E. M. 1962. Diffusion of Innovation. New York: The Free Press.
- Rogers, E.M. 1983. Diffusion of Innovation (Third Edition). New York: The Free Press.

- Sarker, S. 1995. Communication Media Used by the Small Farmers in Receiving Agricultural Information. M.Sc. (Ext. Ed.) thesis, Dept, of Agricultural Extension education, BAU, Mymensingh.
- Sawheny, M.M. 1969. Farm Practice Adoption and the Use of Information Sources and Media in a Rural Community in India. Rural Sociology, 32, Madison University of Wisconsin.
- Shin, W.R. and J.F. Evans. 1991. Where staff get information. Journal of Extension. 29(3). Retrieved 25 May 2004 from <http://www.ioe.org>. 1991 february.a5.html
- Sianturi, M. 1992. Communication Support , Resources and Structures of Smallholders Rubber Development Project and Adoption of Rubber Technology in Taluk kuantan Unit Riau Province, Indonesia. Philippines Collage, Laguna, The Philippines.
- Singh, K.N. and Ch. Shankariah. 1969. Communication Strategy for Developing Countries with Speacial References to India a View Point-A Paper Presented at the 11th World Conference. Society for International Development, held from November 14-17, at New Delhi.
- Singh, R. and S.K. Sharma. 1973. A Comparative Study of Adoption of HYV Program by the Farmers' of TV and non-TV Villages. Indian Journal of Extension Education. 9 (3&4): Pp 92-101.
- Tanvir, A. 2007. Roles of Information and Communication Technologies (ICTs) for Alleviate Poverty through Agricultural Development in SAARC Countries: Country Paper Pakistan. ICT for Agricultural Research and Development. Pp 67-77.
- Uddin, M, A. 1993. Information Received by the Sugarcane Growers in Kot Chandpur Thana. M.Sc. (Ag. Ext. Ed.) Thesis, Department ol Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh.
- Ullah, A.K.M. 1996. Information Media Used by Vegetable Growers in Kashmpur Union under Gazipur Sadar Thana. M.Sc. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Institute of Postgraduate Studies in Agricultural (IPSA), Salna, Gazipur.
- World Bank. 1992. Agricultural Knowledge and Information System and Poverty Reduction, World Bank Discussion Paper.

2. Do you have the following assets?

No.	Assets	Yes=1	No=2
1	Radio		
2	Mobile		
3	Television (TV)		
4	Computer		
5	Bicycle		
6	Motor Cycle		

Household Income and Expenditure

10. Household total annual income in

Source of income	After use ICT	Before use ICT
Agriculture		
Others		

11. Household expenditure in (Tk / Family / Annual)

Expenditure type	Annual (Tk)
Agriculture	
Others	

Market Information:

12. Do you sell surplus crops?

1. Yes 2. No

13. How do you accomplish marketing agricultural products?

1. Self-marketing 2. through salesman 3. other ways

14. Where from do you know the market price of your crops?

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

15. If yes, who sell crops at house, field and markets?

Selling point	Wife = 1	Husband = 2	Both = 3
House			
Field			
Local market			
Whole sale market			

16. What is the distance of local and wholesale markets from your house?

Market Distance (km)

Local market

Whole sale market

17. Is there any organized group for selling crops?

1. Yes 2. No

18. Networking with other parties through ICT and electronic media

No	Purposes	Radio =1	TV=2	Mobile=3	Extension worker= 4	Internet=5	Others=6
1	Among entrepreneurs						
2	Suppliers						
3	Customer						
4	Development agency						
5	Private company						
6	Projects						
7	International agency						

Purpose of using ICT and sources of information:

19. Do you watch television regularly?

1. Yes 2. No

20. Which T.V programmes do you prefer?

1. News 2. Agricultural programmes 3. Movies 4. Others

21. Reasons of using mobile phone

1. Family communication 2. Agricultural information 3. Entertainment 4. Others

22. Which service do you choose to obtain agricultural information?

1. 7676 (Banglalink)
2. Agri help line 27676 (Rabi)
3. Agri. Call center (09633123123)
4. Others

23. Which programmes do you listen most? (Answer may be more than one)

1. News 2. Music 3. Programmes related to agriculture 4. Others

24. How do you get information regularly about weather forecast like humidity, cloud, rainfall drought, fog, heat etc.

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

25. . Is there any call center in your locality?

1. Yes 2. No

26. How do you get market information?

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

27. How do you get production input?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
28. How do you get knowledge of Loan services?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
29. How do you know post-harvest information?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
30. How do you know control of disease?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
31. How do you know the Output Processing?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
32. How do you get the information related to pest management?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
33. Have you ever tested soil of the land you cultivate?
 1. Yes 2. No
34. Which institution has tested your soil?
 1. SRDI 2. NGO 3. Others
- Responses related to Fisheries:**
35. Do you cultivate fish?
 1. Yes 2. No
36. From where do you collect information about hatchling, quality feed and others?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
37. From where do you collect information about quality fingerling?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
38. Which is the source of information in using fertilizer in proper way in your pond/gher?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
39. What is the source of information to maintain the quality of pond water?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
- Responses related to livestock:**
40. Do you rear cattle?
 1. Yes 2. No
41. Do you vaccinate your cattle regularly?
 1. Yes 2. No
42. From where do you know about vaccination?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others
43. What is the source of information regarding health care of cattle?
 1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

Responses related to vegetables:

44. Do you cultivate vegetable?

1. Yes 2. No

45. Which media influence you more in growing vegetables?

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

46. Where from do you know the market price of your vegetables?

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

47. How do you get the information related to pest management for vegetables?

1. Radio 2. TV 3. Mobile 4. Extension worker 5. Internet 6. Others

Problems and obstacles in using ICT

No.	Purposes	Yes=1	No=2
1	Do not know the benefits of ICT?		
2	Have no skills in using ICT?		
3	Lack of time to use ICT		
4	Difficulty in using ICT		
5	Have no knowledge in using ICT		
6	Price for ICT tools are expensive		
7	Lack of ICT training		
8	Language problem		
9	Lack of technology infrastructure		
10	No needs in using ICT		
11	Not confidence in using ICT		
12	Lack of support from the authorities		
13	ICT is not user friendly		
14	Lack of ICT support service		
15	Believe that ICT is not safe		
16	Lack of support staffs who have expertise in ICT		
17	Lack of updated agriculture information in ICT		
18	Unstable opportunity in accessing ICT		
19	Lack of agriculture content in local ICT		

What is the current status of your membership and leadership with groups, associations and organizations?

Type of Institution	Yes = 1	No = 2
IPM club member		
ICM club member		
Common interest group member		
UP member		
UP standing committee member		
Market management committee member		
Organized marketing group member		
Organized marketing group leader		
Salish committee member		
School management committee member		
NGO group member		
NGO group leader		
Corporative society member		

Existing agriculture extension services

Status of direct access to technical assistance from the existing agriculture extension service providers

Service provider's name	1. Wife		2. Husband	
	Yes = 1	No = 2	Yes = 1	No = 2
DAE (SAAO)				
Agri. inputs dealers				
Private agri. inputs company				
NGO				
BADC				
Agri. project				
University				
Innovative farmers				
Media				

Signature

Date